Capstone Industry Council Meeting

Welcome – Sue Gardner
Opening Remarks

March 8, 2006

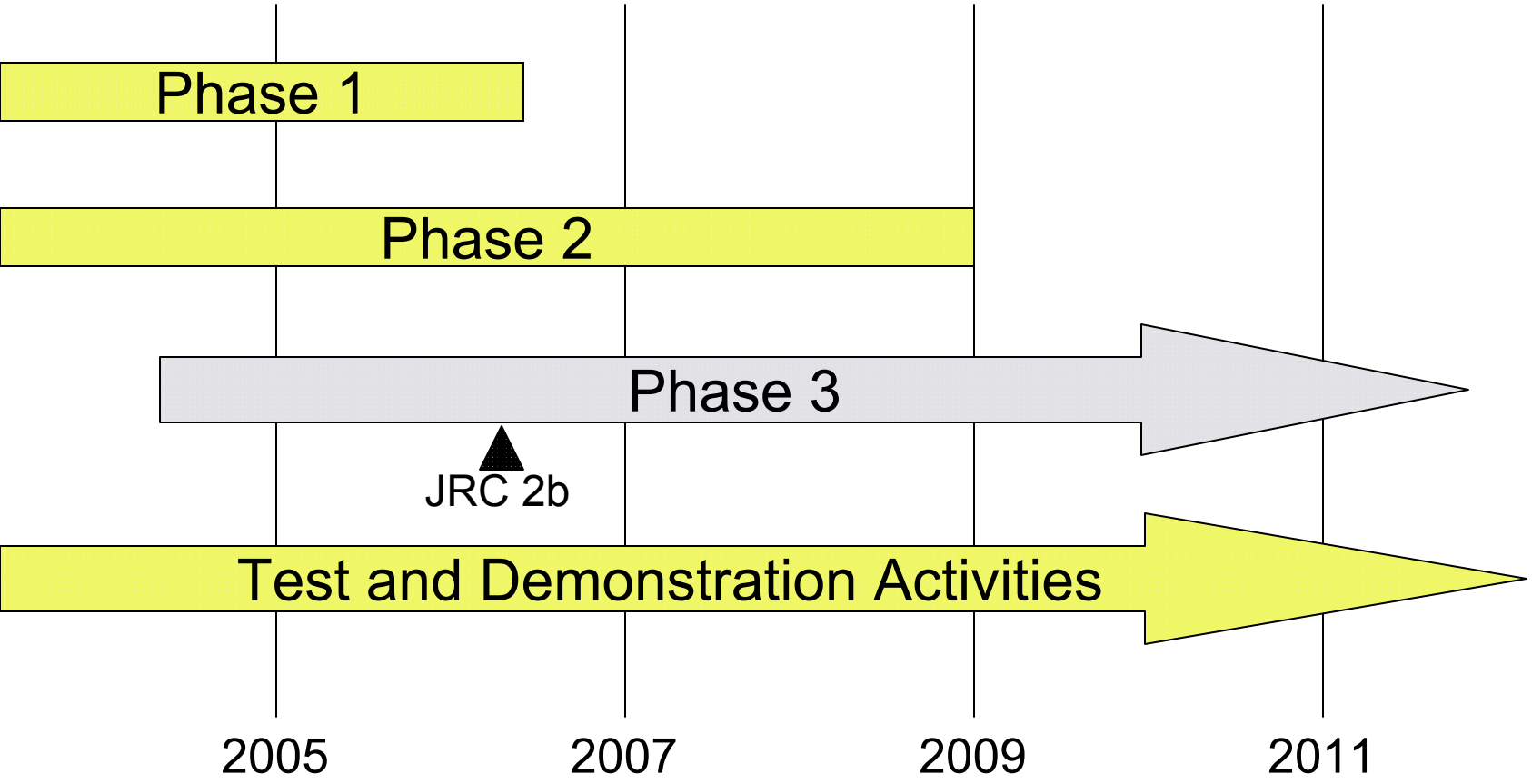
Agenda

- 0800-0830 Information Sharing
  - Opening — Sue Gardner
  - Phase I — Ray Collins/Mark Olson
  - Phase II — Ray Collins/Mark Olson
  - WAAS — Sue Gardner
  - WCAMS — Sue Gardner
- 0830-1000 Strategic Planning
  - Phase III — Statewide Briefing – Capstone Team
  - Industry Feedback — Roundtable

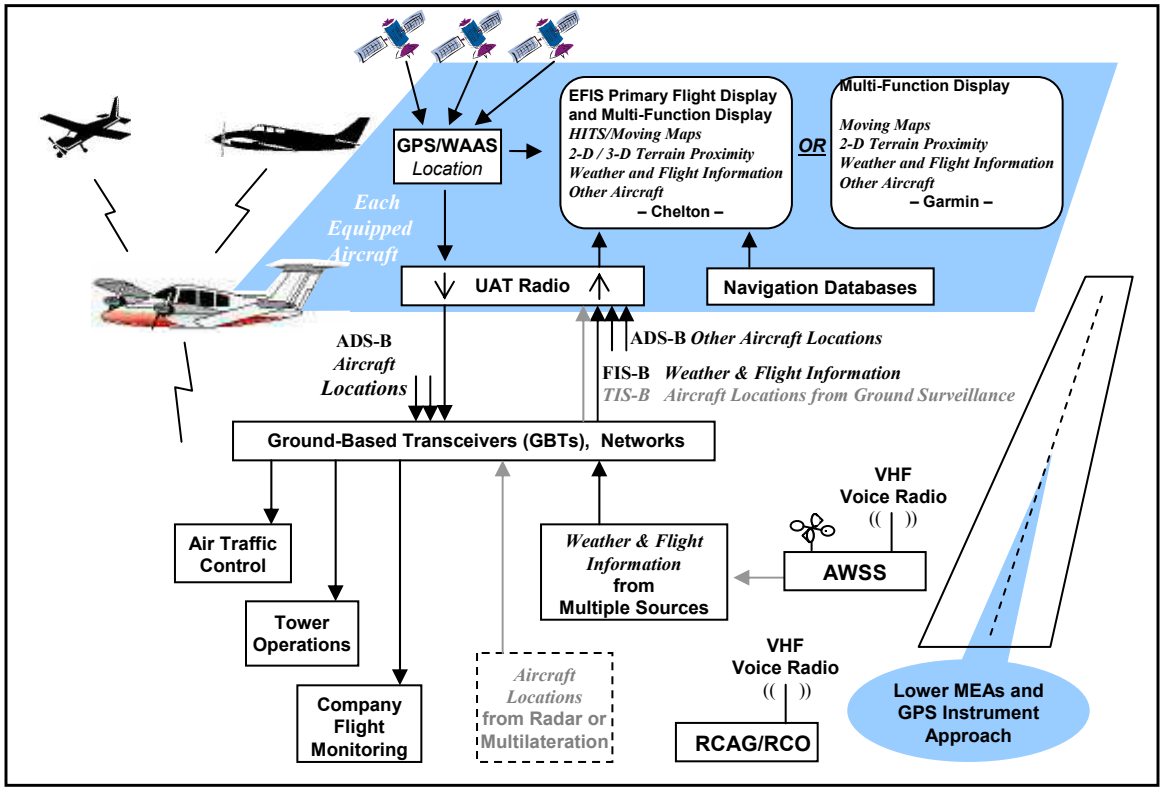
Capstone Mission Statement

- …an Alaska Safety and Capacity Program which seeks near term safety, access and efficiency gains by accelerating implementation and use of new NAS technologies
- ….links multiple programs and initiatives under a common umbrella for planning, coordination, focus and direction
- ….develops capabilities and requirements jointly with FAA, the Alaskan community and aviation industry in a manner consistent with future NAS plans and concepts, and implements in a manner leading to self-equipage

Background: Capstone Program Activities



Definition of Solution-Bundling of Technologies



- **GPS/WAAS**
  - –Approaches
  - –Routes
  - –AWSS
  - –Comm (RCO/RCAG)
- **MFD –** Terrain Data/Moving Maps
- **ADS-B (UAT/GBT)**
  - –Situational awareness
    - •ATC
    - •Pilot
    - •Vehicle Operators
  - –Flight Monitoring/Following
- **FIS-B** (Flight Information Services)
  - -Weather
  - -NOTAMS/TFRs
  - -PIREPS/SIGMETS/ AIRMETS
- **TIS-B** (Traffic Information Services)
- **Automation Interfaces**
  - **M-EARTS/CCCS**
  - –Capacity for added GBTs
  - –Route development
  - –Other enhancements

Operational Enhancements

- Enhanced Operator Flight Monitoring
- Expedited Search and Rescue
- Reduced Pilot Workload
  - Enhanced pilot communications (situational awareness and decision making)
  - Fleet Transition toward more capable aircraft
    - IFR
    - Multiengine
  - Improved Safety Culture
- Reduced Controller Workload

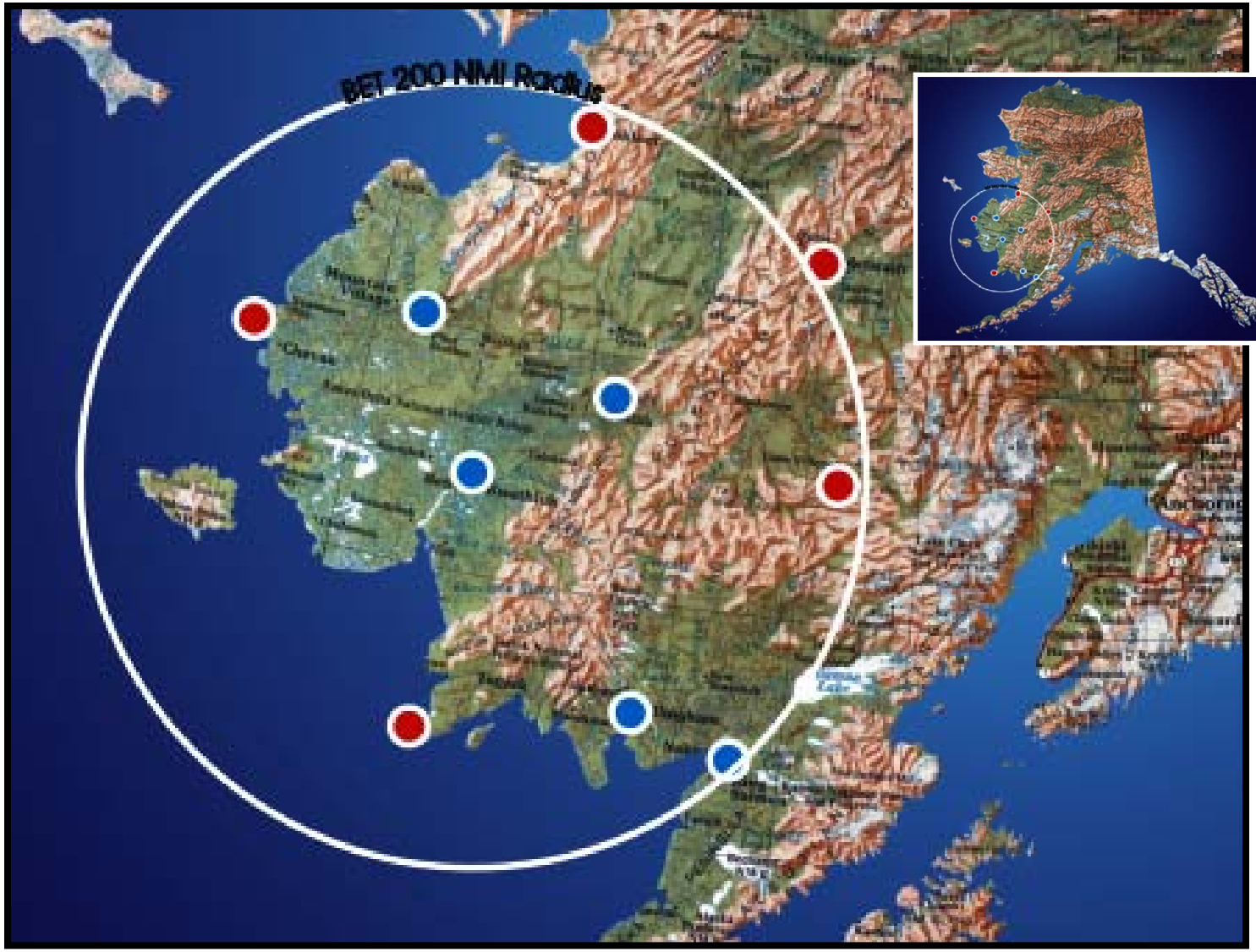
Emerging Technology Test & Demonstration

- Traffic Information Service-Broadcast (TIS-B) **- provide pilots info on transponder equipped aircraft over ADS-B**
- Terminal Approach & Automation - **that is enhanced through the use of ADS-B**
- Vehicle surface monitoring - **using ADS-B information received from ADS-B equipped vehicles**
- Flight Service Display - **using ADS-B data for advisory information only when the control tower is not operational**
- Satellite data link **- supplement the use of GBTs for data link information**

Phase I

- Phase I — Ray Collins/Mark Olson
  - Avionics
  - GBTs

Phase I Avionics



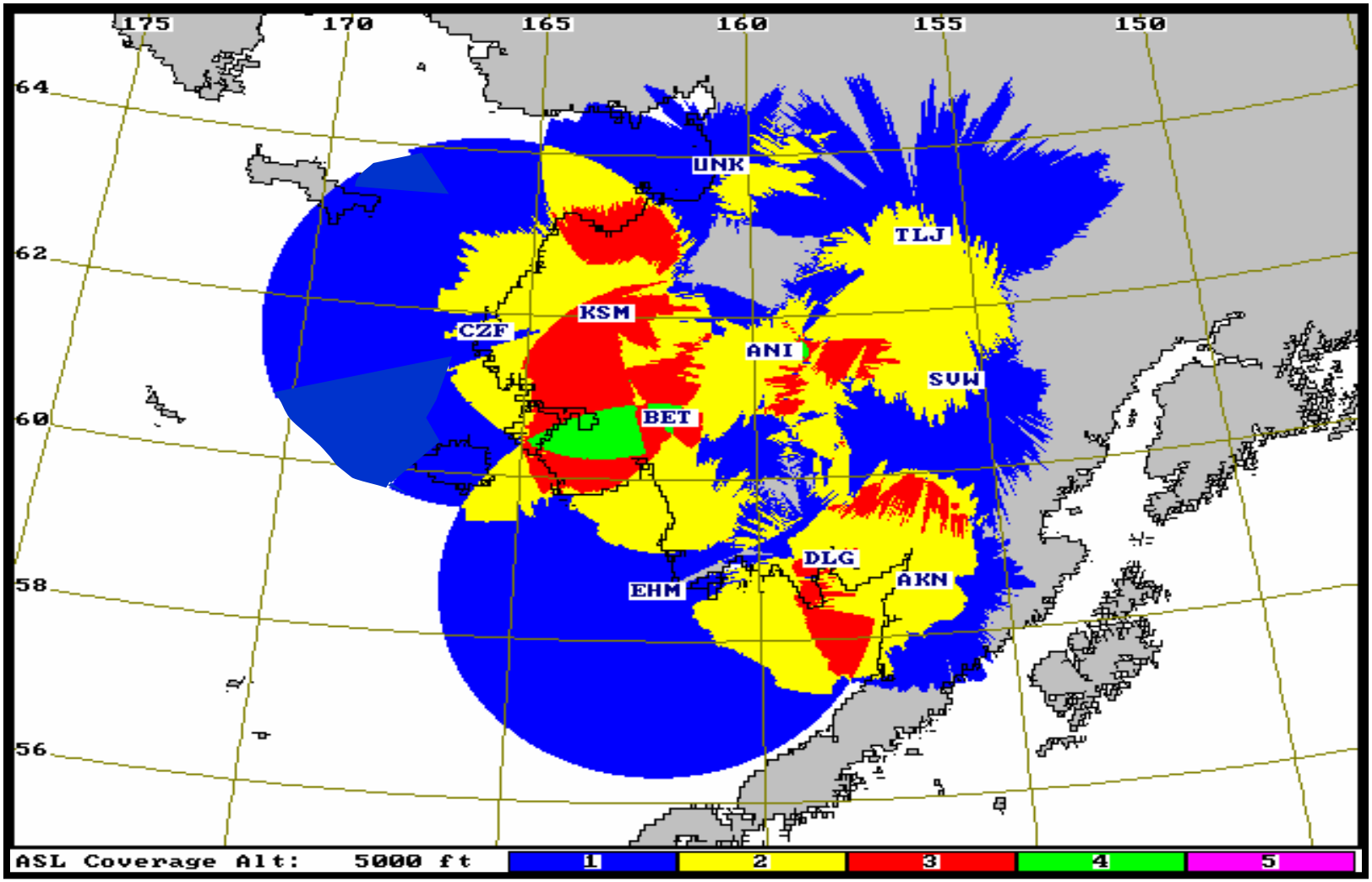
Ops

- BET
- ANI
- KSM
- AKN
- DLG

Test

- UNK
- SVW
- TLJ
- CZF
- EHM

CAPSTONE SERVICES	Status as of: 3/03/06				
				Operator Fleet Monitoring	
	ADS-B Surveillance	FIS-B	TIS-B	CRABS	VOLPE / Flight Explorer
Phase I: Y-K Delta					
Bethel	X	X	N/A	X	X
Aniak	X	X	N/A	N/A	X
St. Mary's	X	X	N/A	N/A	X
Dillingham	X	X	N/A	N/A	X
King Salmon	X	X	N/A	N/A	X
Unalakleet	# TBD	X	N/A	*	*
Sparrevohn	# TBD	X	N/A	*	*
Tatalina	# TBD	X	N/A	*	*
Cape Romanzof	# TBD	X	N/A	*	*
Cape Newenham	# TBD	OUT of service	N/A	OUT of service	OUT of service
Site Summit	Spring '06	X	X	X	N/A
Phase II: Southeast					
Juneau	Spring '06	X	N/A	X	N/A
Yakutat	Summer '06	X	N/A	X	N/A
Sisters Island	Summer '06	X	N/A	X	N/A
Gustavus	Summer '06	X	N/A	X	N/A
Lena Point	Summer '06	X	N/A	X	N/A
Biorka	Summer '06	X	N/A	X	N/A
Gunnuk	Summer '06	X	N/A	X	N/A
Wrangel	Summer '06	X	N/A	X	N/A
Angoon	Summer '06	X	N/A	X	N/A
Haines	Summer '06	X	N/A	X	N/A
Notes:					
Future dates are estimated; Southeast sites beyond JNU dependent upon In Service Decision					
N/A = Not Available					
# TBD = These sites are in "transition" from developmental to operational use. Activation in the automated radar tracking system is awaiting a decision from ATO-E at FAA Headquarters. Original transition period was scheduled for 12/15/05 - 1/4/06. Current date is unknown by the Capstone Program Office and is in the hands of the Vice President for En Route and Oceanic Services.					
* = Operator Fleet Monitoring transitions to VOLPE/Flight Explorer when ADS-B Surveillance services begin; there is a transition period when fleet monitoring is unavailable. Availability date is dependent upon ATO-E decision to activate the GBTs on the operational automated radar tracking system (see above note).					
Cape Newenham out of service until further notice due to wind damage to satellite communications facility					

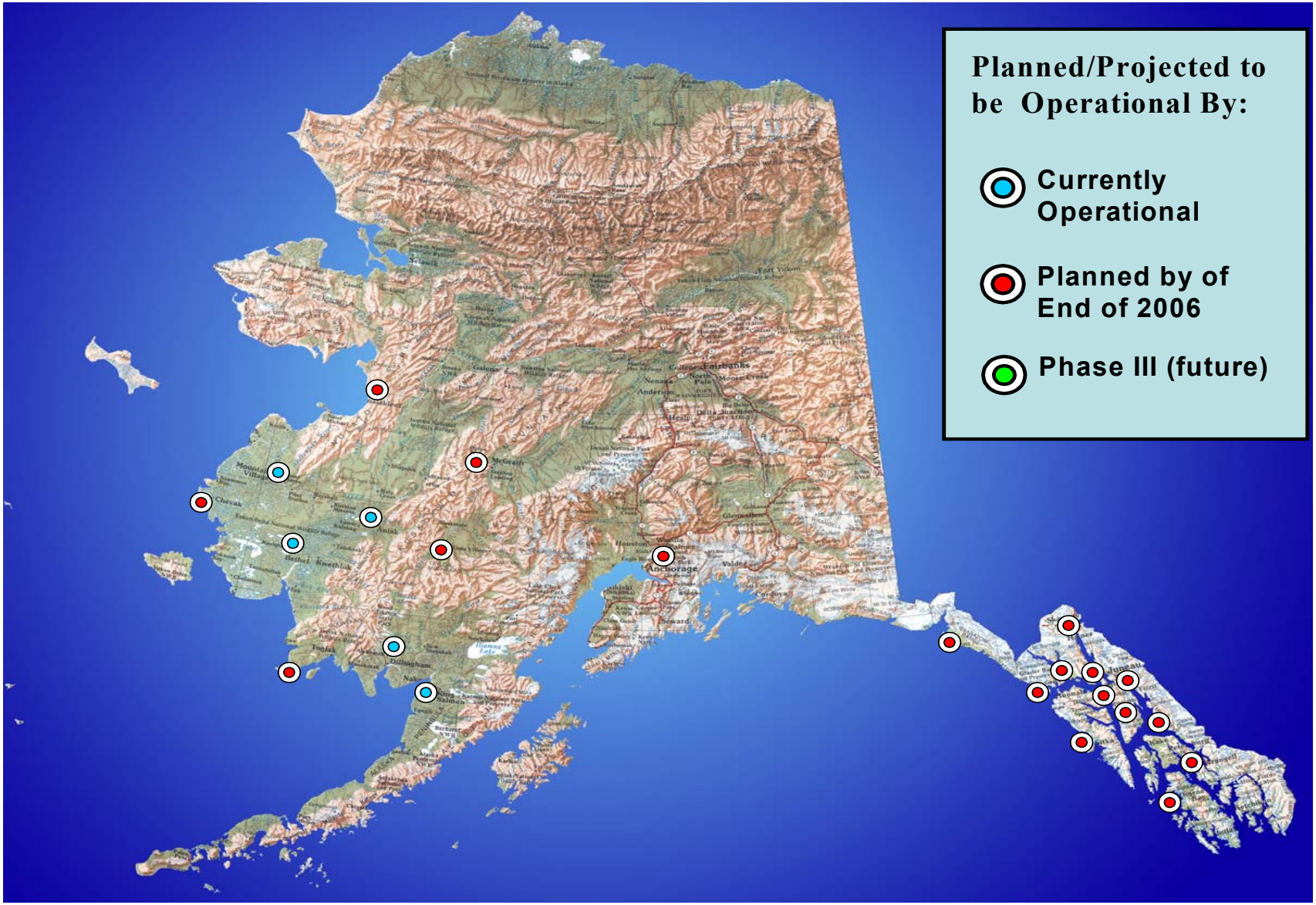

175
170
165
160
155
150
64
62
60
58
56
UNK
TLJ
KSM
CZF
ANI
SVW
BET
DLG
AKN
EHM
ASL Coverage Alt: 5000 ft
1
2
3
4
5

Phase II

Phase II — Ray Collins/Mark Olson

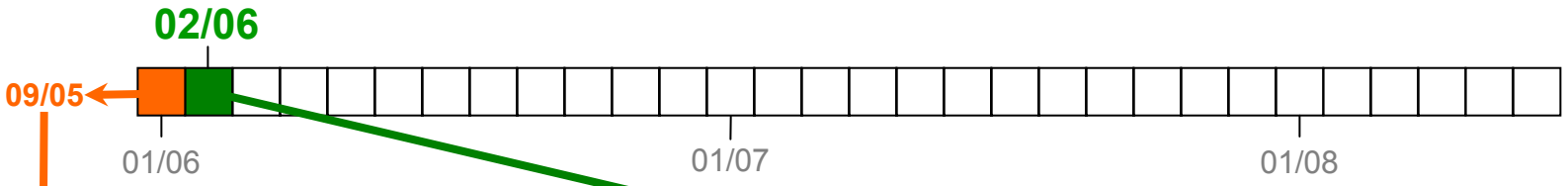
- Avionics
  - Garmin – STC Helicopter
  - Installs
- GBTs

Phase II Avionics


Planned/Projected to be Operational By:
Currently Operational
Planned by of End of 2006
Phase III (future)

WAAS Development 2006 - 2008

- Improvements to obtain full LPV performance
  - Increase communications capacity – September 2005
  - New WRS
    - Alaska
      - Four new sites installed February 2005
      - Operational 2006
    - Canada
      - Two sites installed Summer 2005, two to be installed Summer 2006
      - Operational 2007
    - Mexico
      - Three sites installed Summer 2005, two to be installed Summer 2006
      - Operational 2007
  - Replace GEO communication links
    - Launched in September and October
    - Operational 1st/2nd Quarter FY07
  - Software integrity monitor improvements to be introduced in 2007 and 2008
  - End state performance will result in greater availability of service

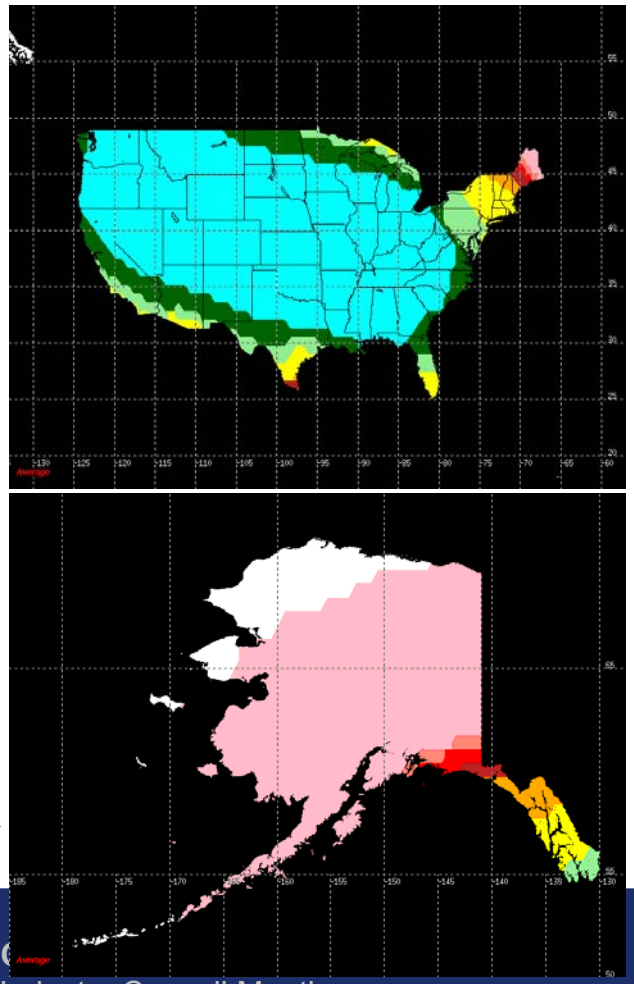


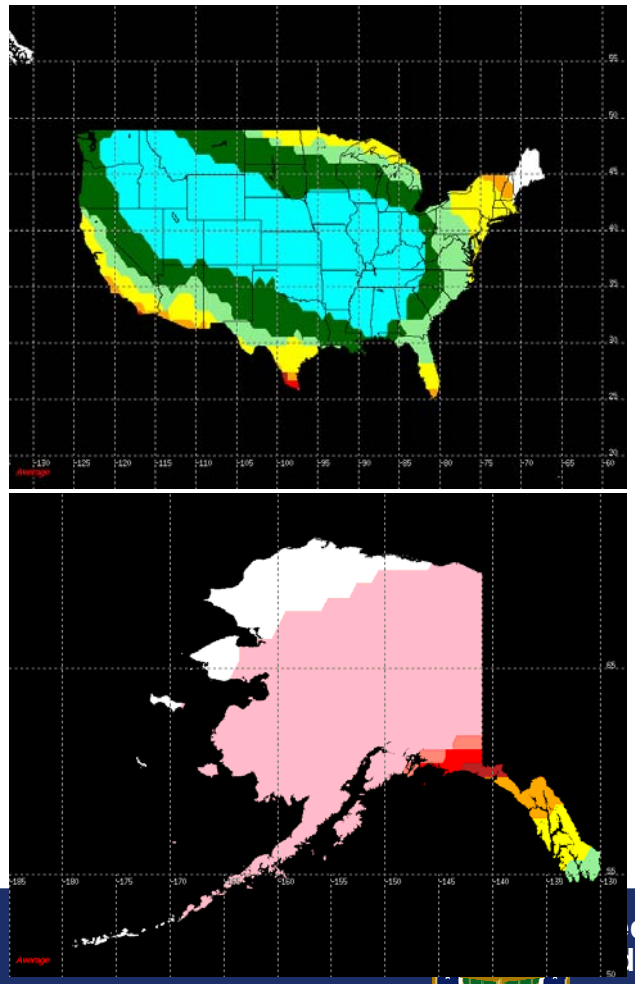
Release 2

GEO Transfer from 54 W to 142 W

CONUS

ALASKA



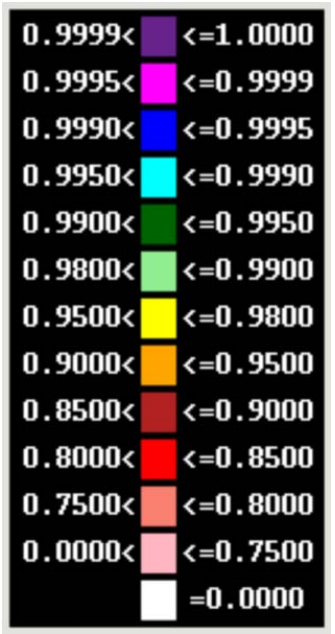


New changes (unrelated to release)

- 142 W GEO used only as a data-link

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = **NM**)



AVAILABILITY

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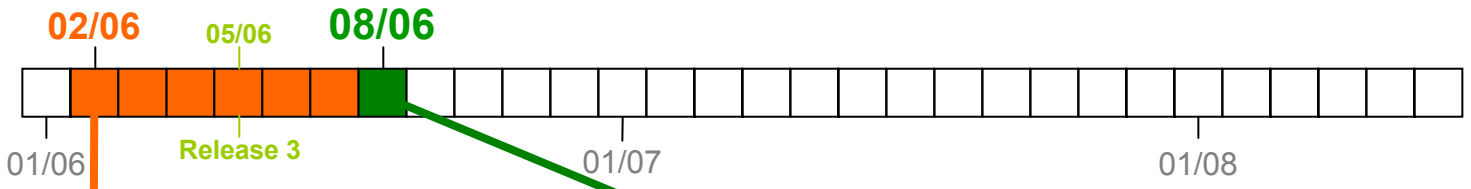
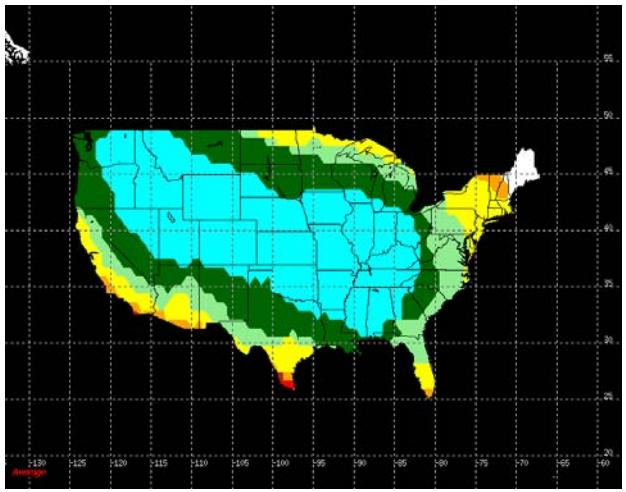


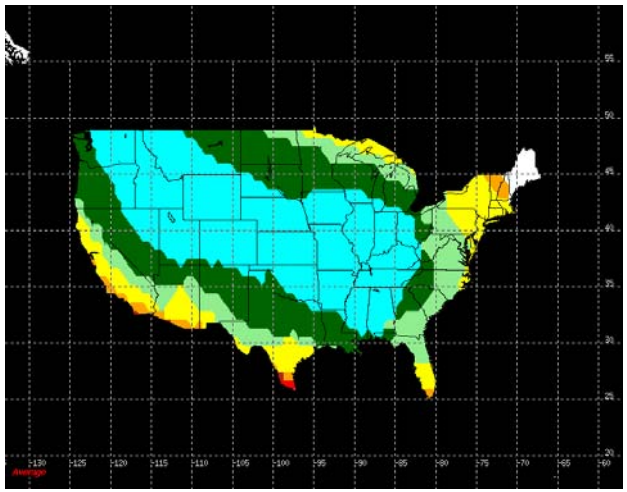
GEO Transfer from 54 W to 142 W

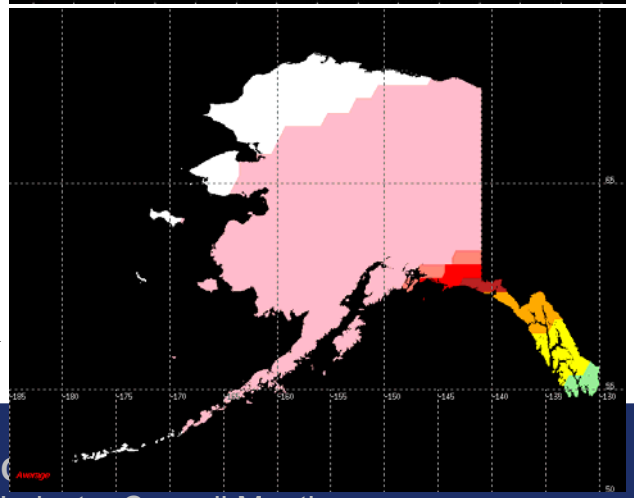
****Release 4**

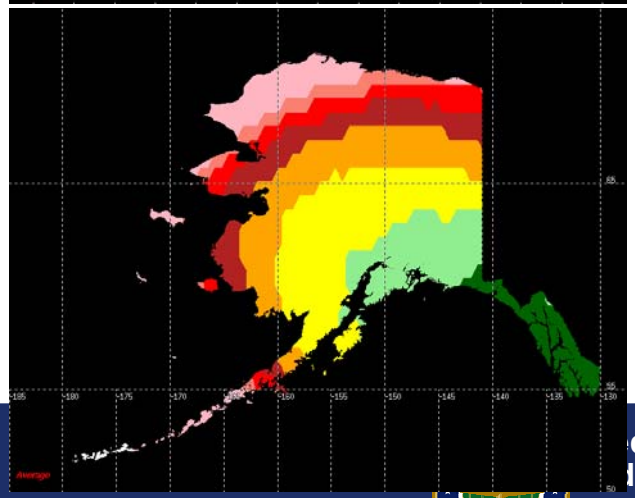
CONUS

ALASKA







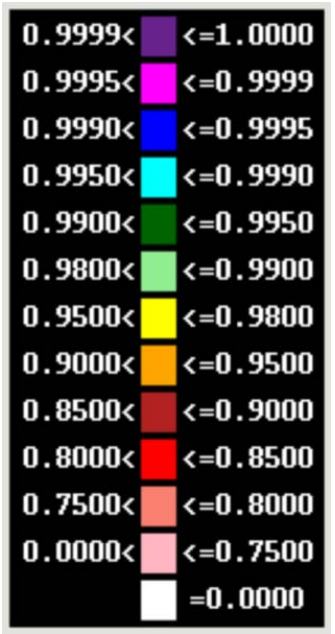


New changes in Release 4

- 4 additional WRS in Alaska

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = NM)



AVAILABILITY

** No impact to availability in Release

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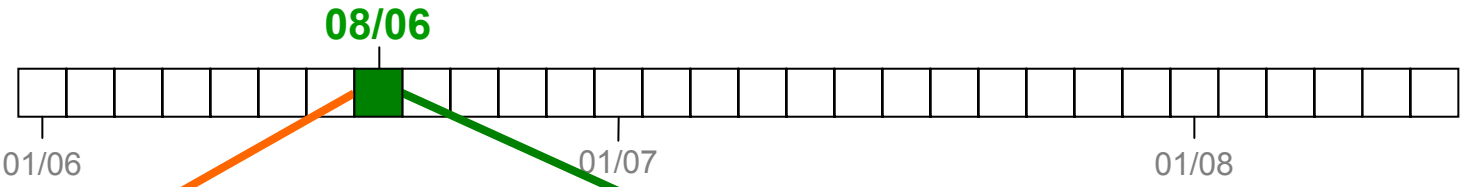
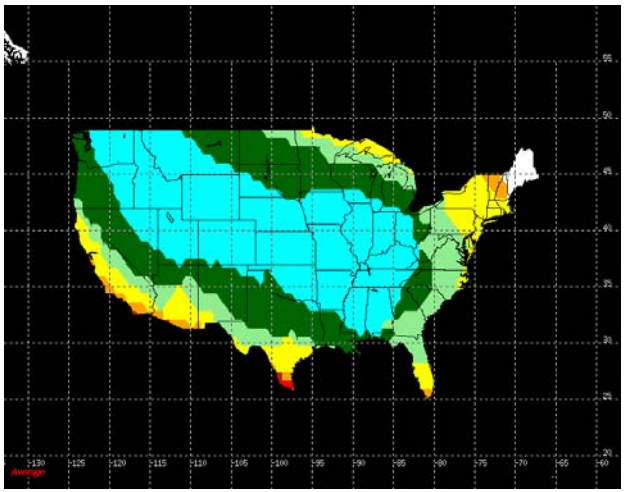


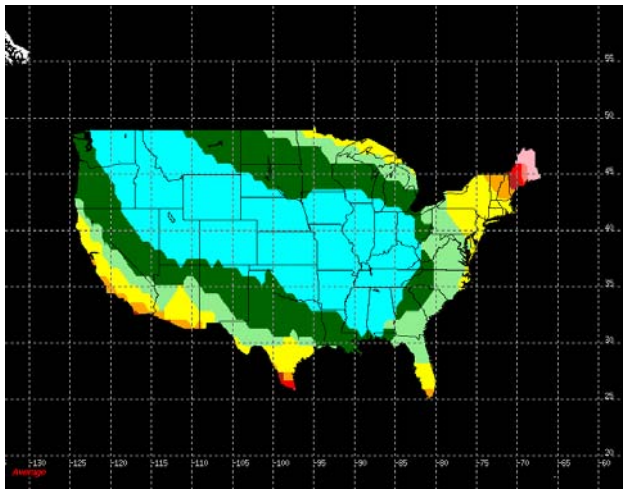
Release 4

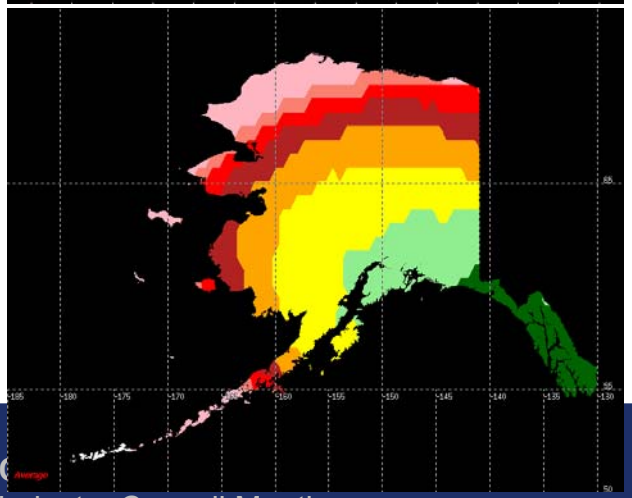
Release 5a

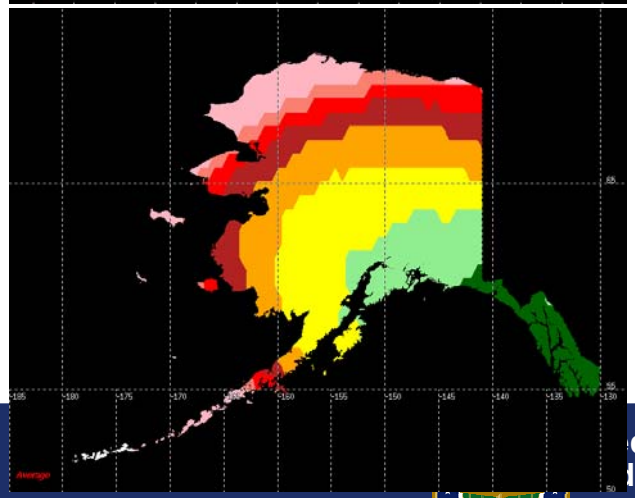
CONUS

ALASKA







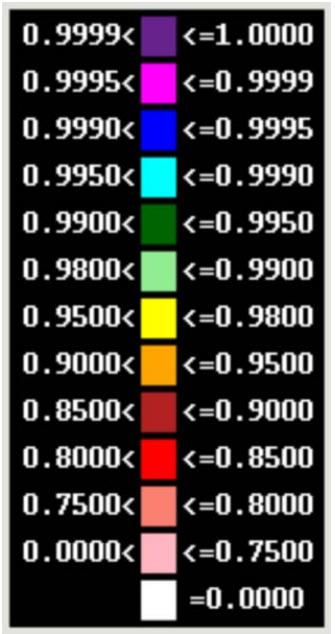


New changes in Release 5a

- 133 W GEO used only as a data-link

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = NM)
- Panamsat: 133 W (UDRE = **NM**)



AVAILABILITY

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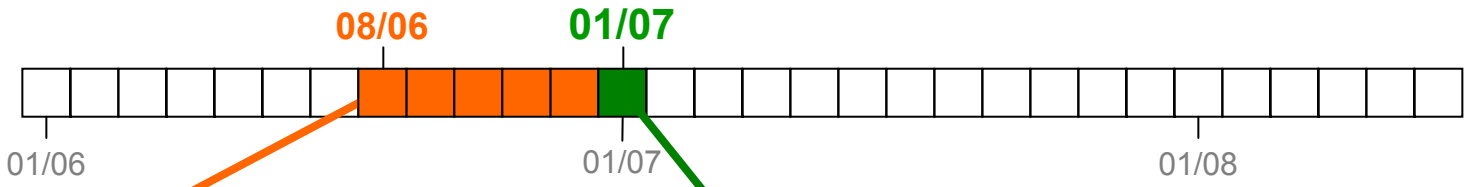
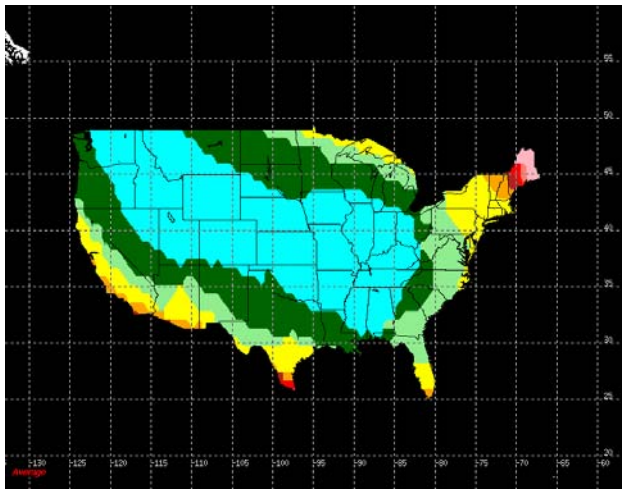


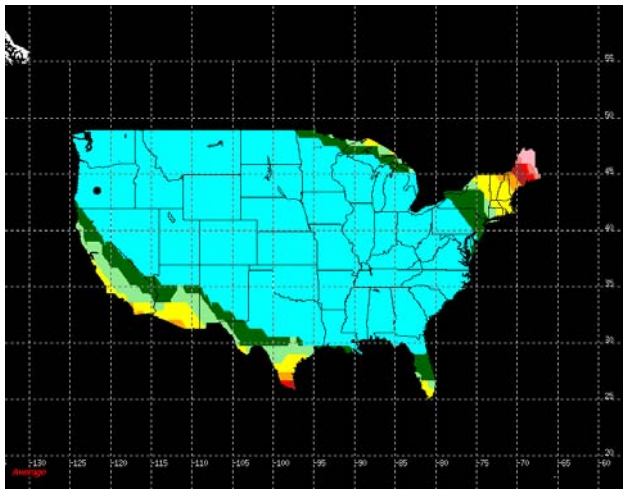
Release 5a

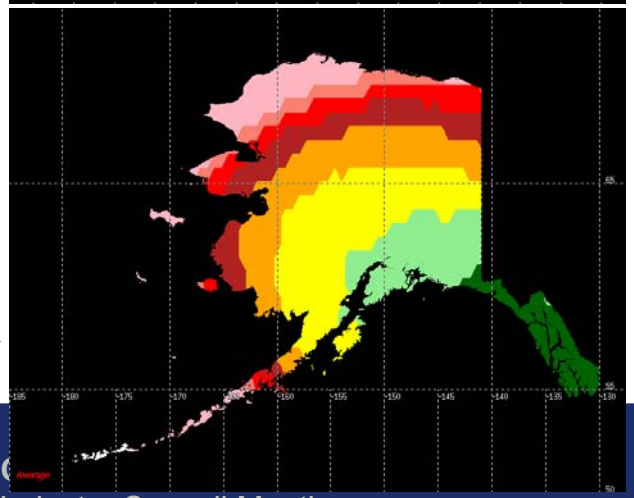
Release 5b

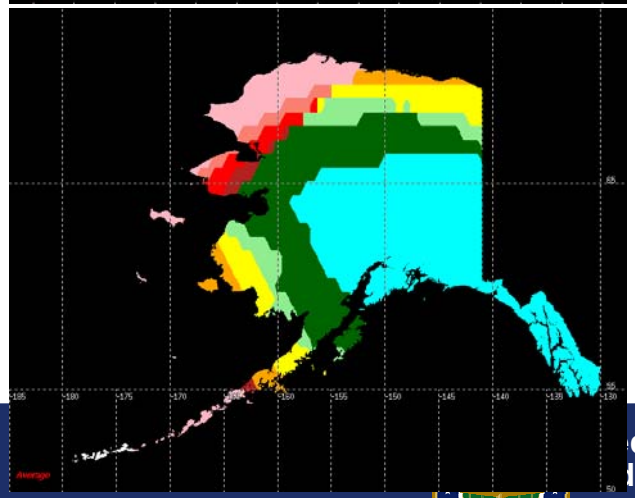
CONUS

ALASKA







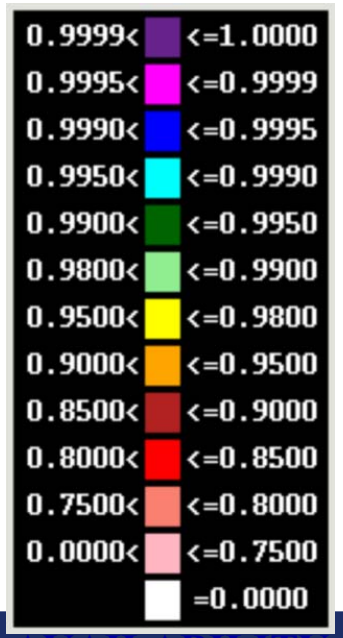


New changes in Release 5b

- 107 W GEO provides both data-link and ranging

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = NM)
- Panamsat: 133 W (UDRE = NM)
- Telesat: 107 W (UDRE = **4.5 m**)



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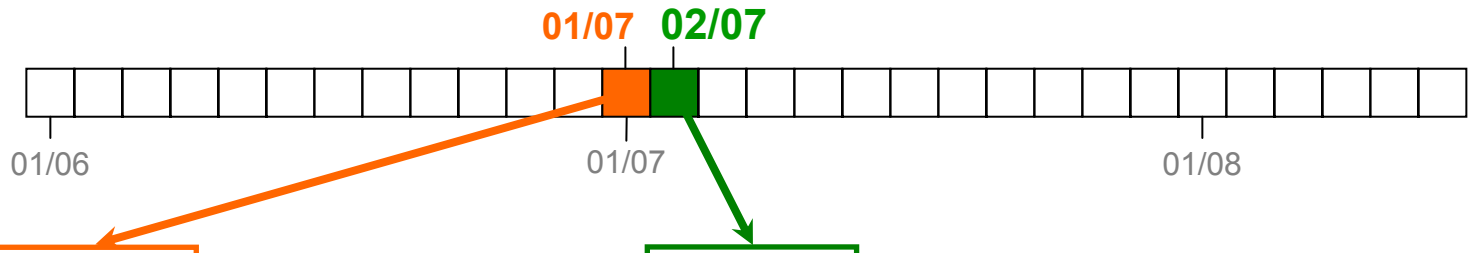
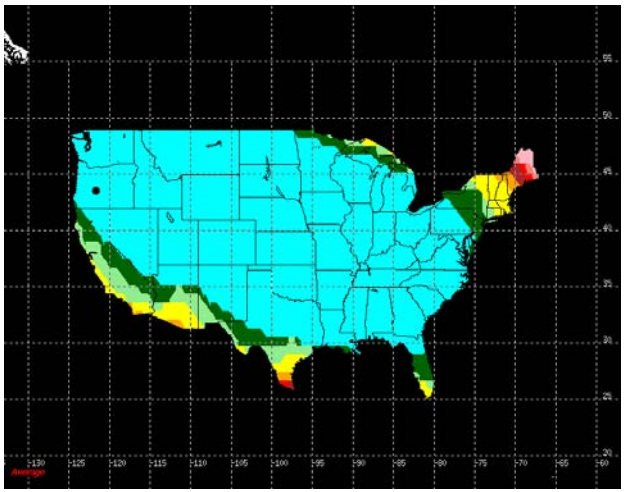


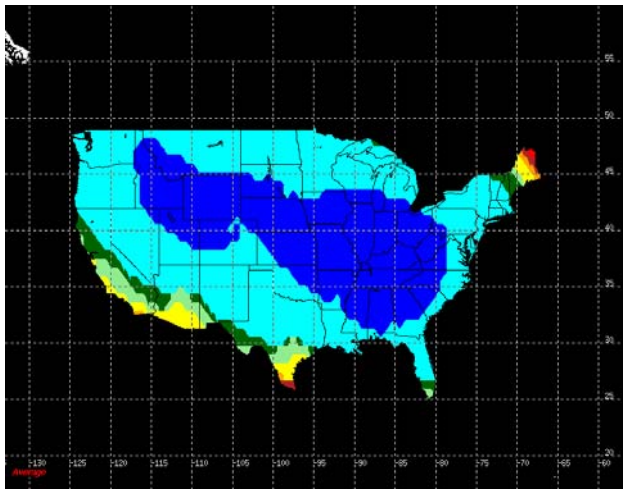
Release 5b

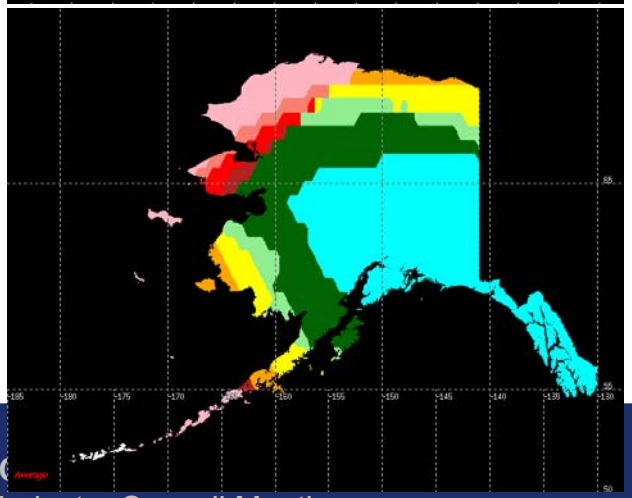
Release 5c

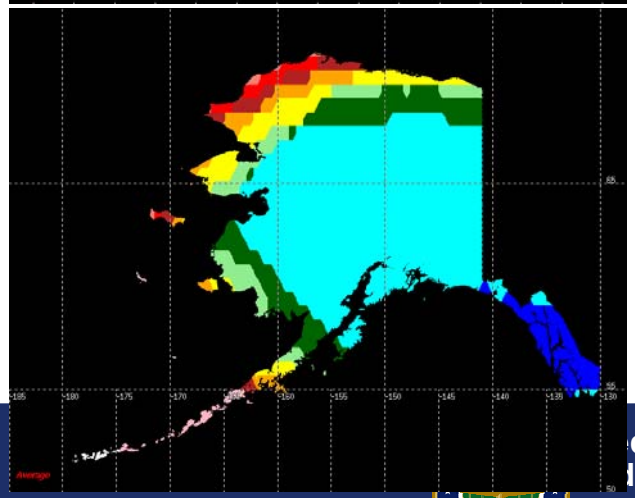
CONUS

ALASKA







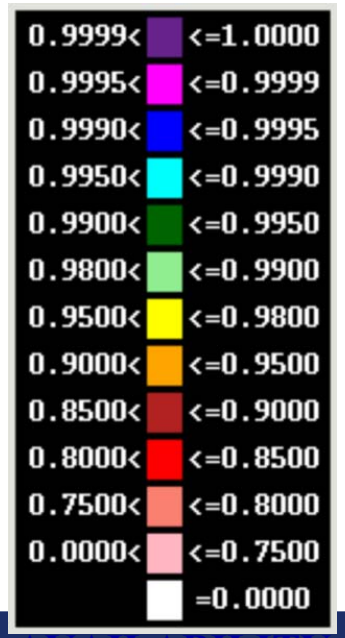


New changes in Release 5b

- 133 W GEO ranging is turned on

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = NM)
- Panamsat: 133 W (UDRE = **4.5 m**)
- Telesat: 107 W (UDRE = 4.5 m)



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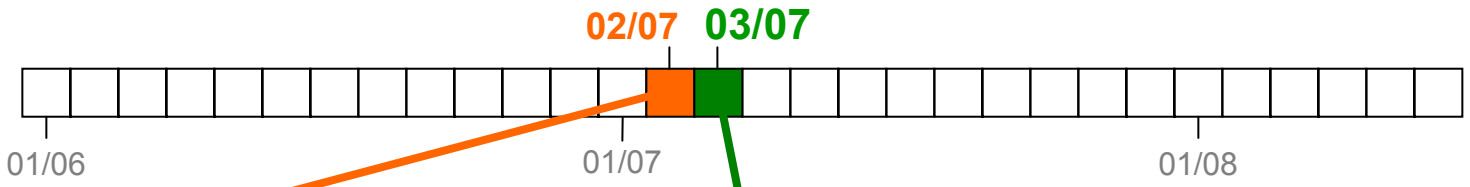
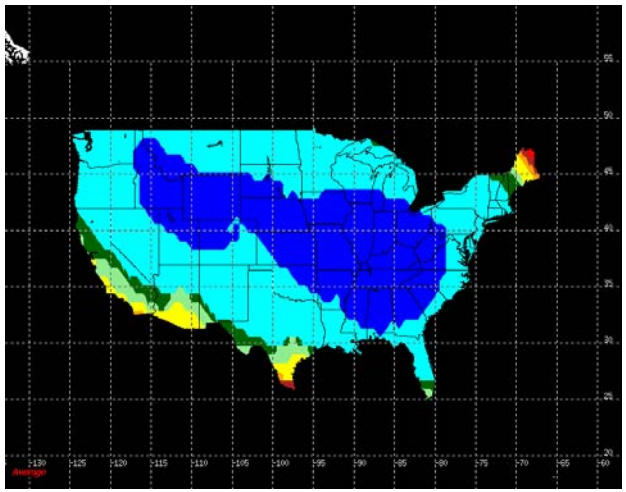
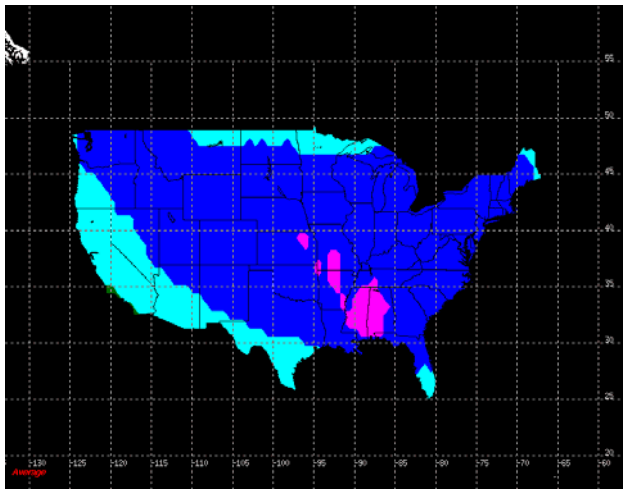


Release 5c

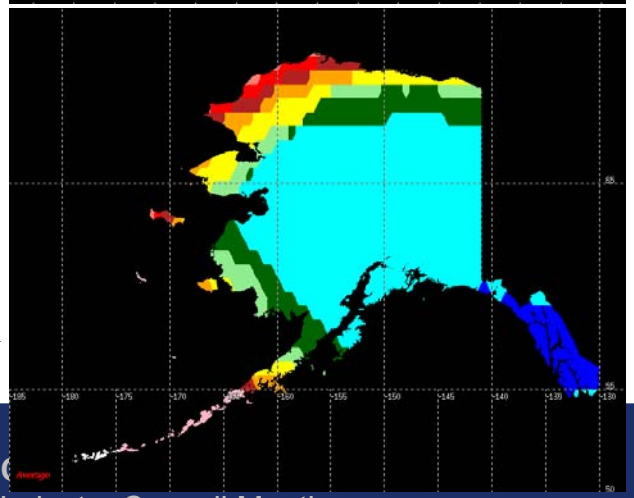
Release 6/7

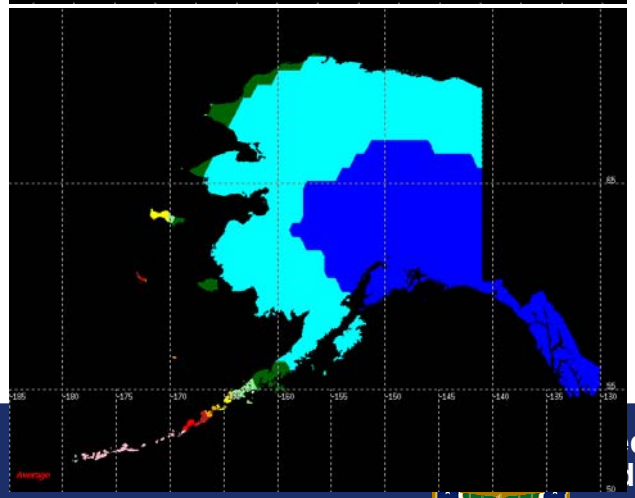
CONUS





ALASKA



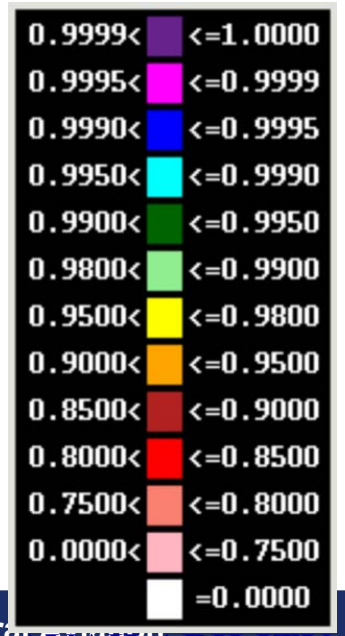


New changes in Release 6/7

- GIVE Monitor Upgrade (PB1)
- 2 New WRS in Canada
- 3 New WRS in Mexico
- Extended IGP Mask (incl. Band 9)

GEO LOCATIONS

- POR: 178 E (UDRE = 50 m)
- AOR-W: 142 W (UDRE = NM)
- Panamsat: 133 W (UDRE = 4.5 m)
- Telesat: 107 W (UDRE = 4.5 m)



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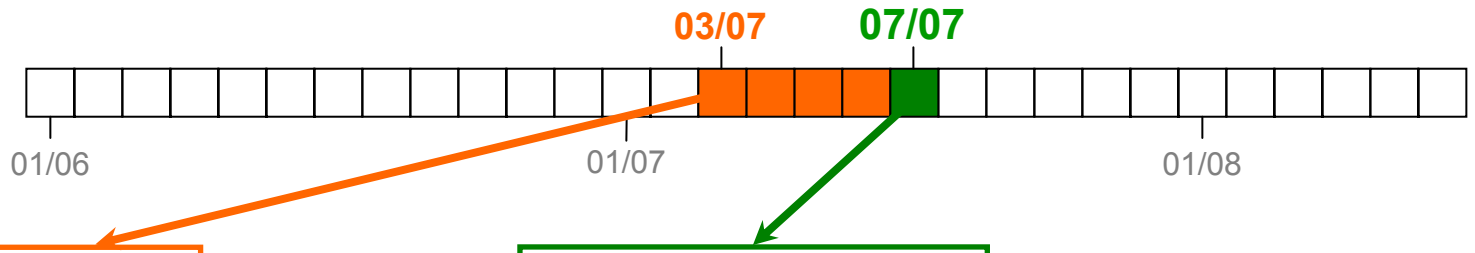
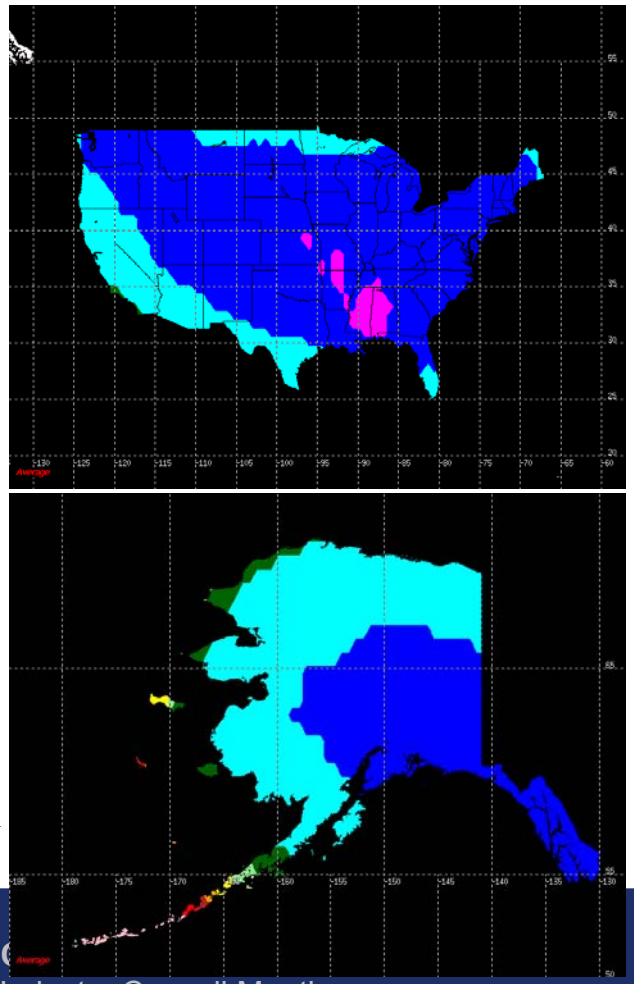


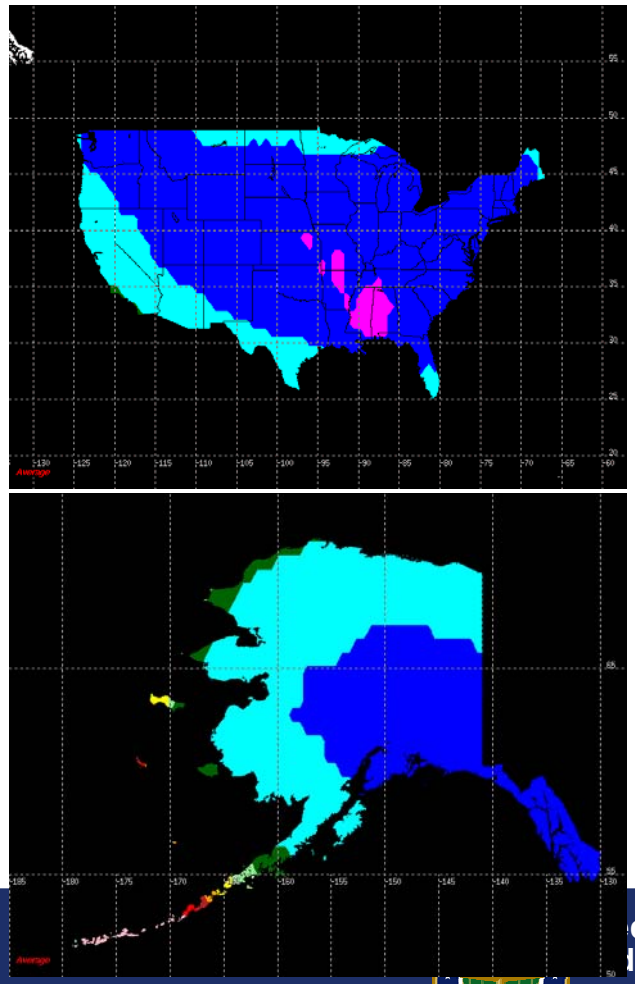
Release 6/7

POR and AOR-W shut-off

CONUS

ALASKA



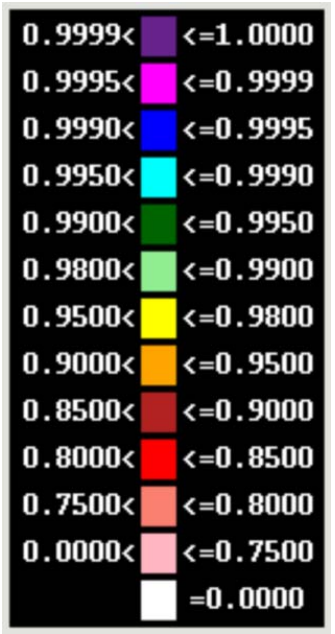


New changes (unrelated to release)

- 178 E GEO is turned off
- 142 W GEO is turned off

GEO LOCATIONS

- Panamsat: 133 W (UDRE = 4.5 m)
- Telesat: 107 W (UDRE = 4.5 m)



AVAILABILITY

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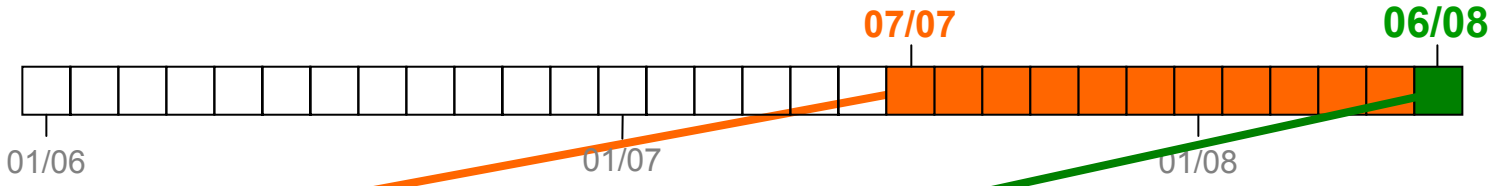
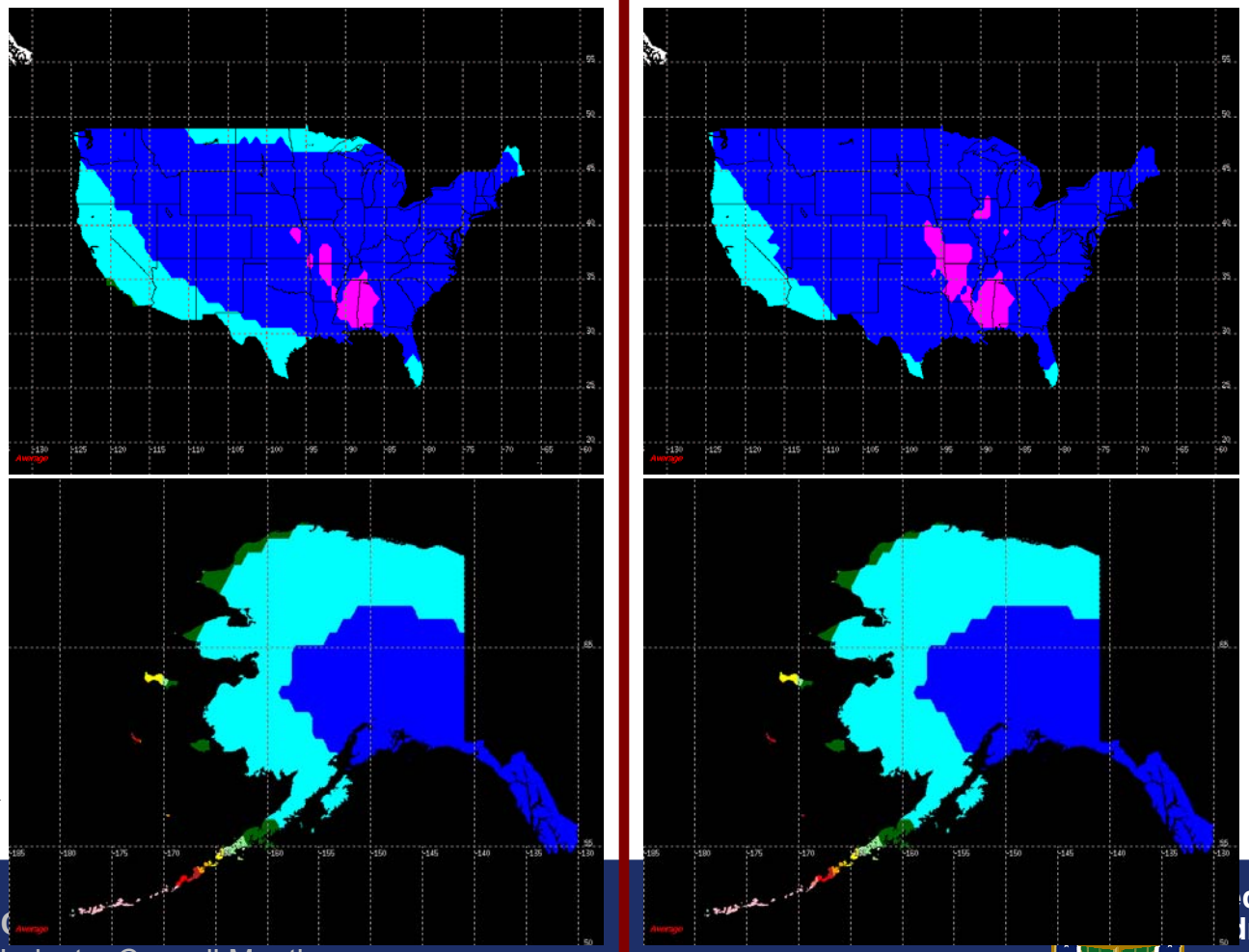


POR and AOR-W shut-off

Release 8/9

CONUS

ALASKA

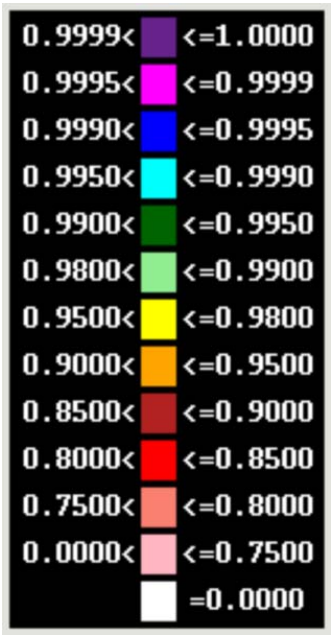


New changes in Release 8/9

- 2 additional WRS in Canada
- 2 additional WRS in Mexico

GEO LOCATIONS

- Panamsat: 133 W (UDRE = 4.5 m)
- Telesat: 107 W (UDRE = 4.5 m)



AVAILABILITY

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FAA Alaskan Region

Capstone

Investment in Safety

Capstone Outreach Overview

Sue Gardner

March 2006

Capstone Phase III
Industry Council Meeting

"I have launched an initiative to galvanize America's energies to design the Next Generation Air Transportation System…that will offer seamless security and added capacity to relieve congestion and secure America's place as global leader in aviation's second century."

Norman Y. Mineta (Secretary, DOT)

"Alaska must have a safe transportation system on parity with the safety systems associated with aviation in the other 49 states."

Alaska Aviation Coordination Council

"Expand and accelerate implementing safety and air navigation improvement programs in Alaska."

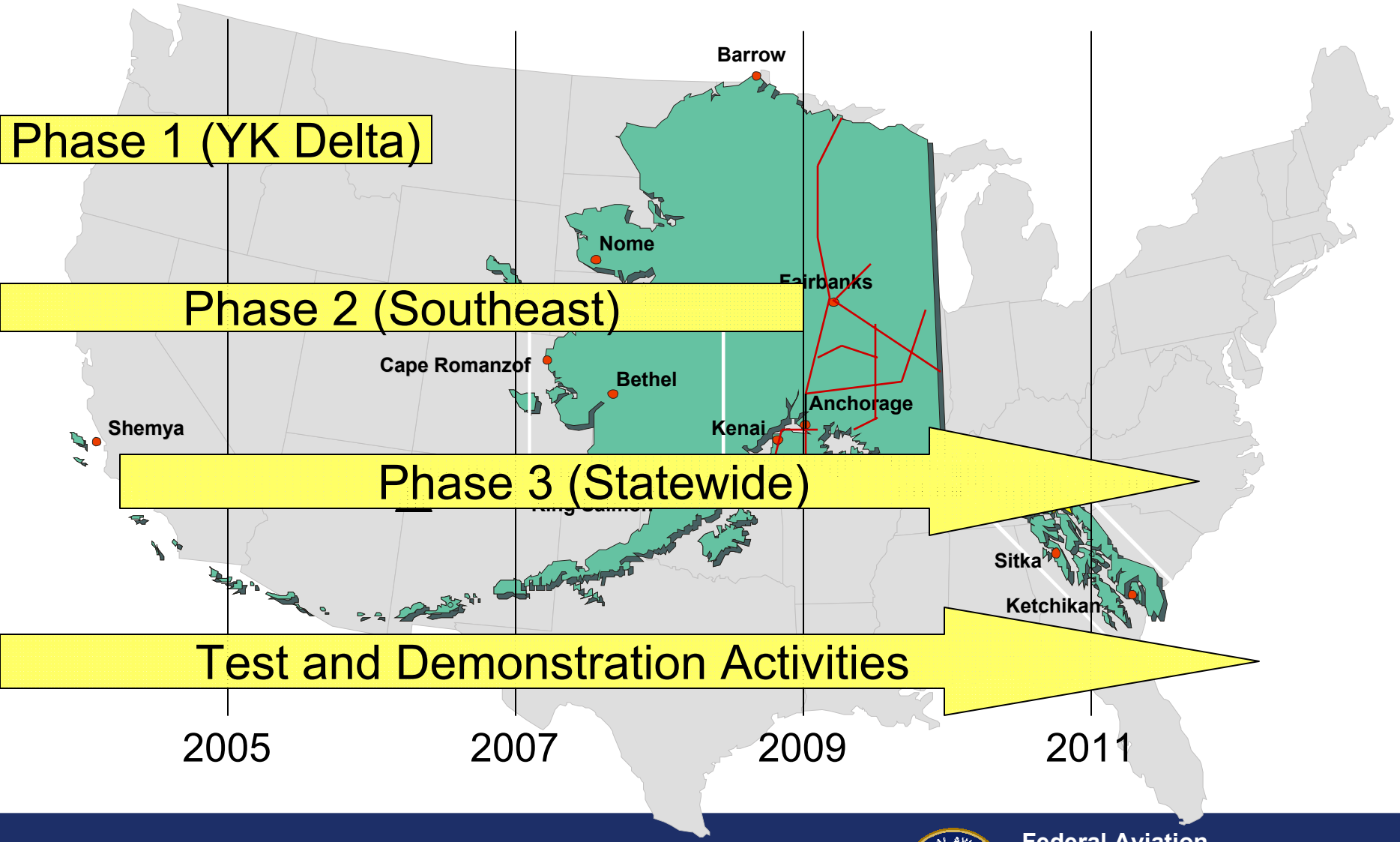
FAA Flight Plan Goal

"When I became Chairman of the Senate Appropriations Committee, the first hearing I held was on aviation safety. I learned that one of every eleven Alaskan pilots was dying in airplane crashes. As a former combat pilot and newly qualified float plane pilot, I knew this was unacceptable, and that with a little ingenuity, we could do better."

"Because of the unique flying conditions in our state, Alaska has been the testing ground for the next generation of safety and air traffic management technology. Our pilots now use Automatic Dependent Surveillance-Broadcast (ADS-B) technology as part of the Capstone Program. While we once had the highest air accident rate in the nation, we are now reversing this trend. ADS-B Capstone technology is saving lives in our state. This type of technology has done more for air safety in our state than all of the federal mandates we have seen in the last ten years"

-Ted Stevens, United States Senator, Alaska
February 14, 2006

Capstone Program Activities



What does the Capstone Program do for Alaska?

Capstone…provides pilots with state of the art navigation and surveillance capabilities based on **satellite** and wireless data communication onboard the aircraft

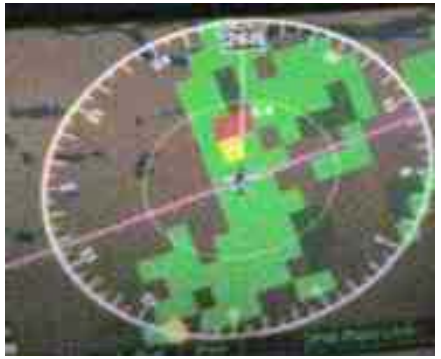
- Significantly improves aviation safety for both Alaska's residents and tourists
- Significantly improves access into and out of Alaska's communities
- Significantly improves Alaska's aviation infrastructure to approach the capability in the lower 48
- Makes Alaska the recognized leader of the Next Generation Air Transportation System in the world

Capstone Aircraft Capabilities

Moving Map

Terrain

Traffic



Weather

Capstone Avionics Needed!

- **Alaska needs widespread avionics equipage early to achieve these Capstone benefits**

- **Traditional FAA / User roles**
  - FAA provides ground and satellite infrastructure
  - FAA may elect to mandate aircraft equipage
  - Users purchase their own avionics to use this infrastructure

- **The responsibility for a statewide implementation program resides within the Alaska community to address the avionics equipage challenge**

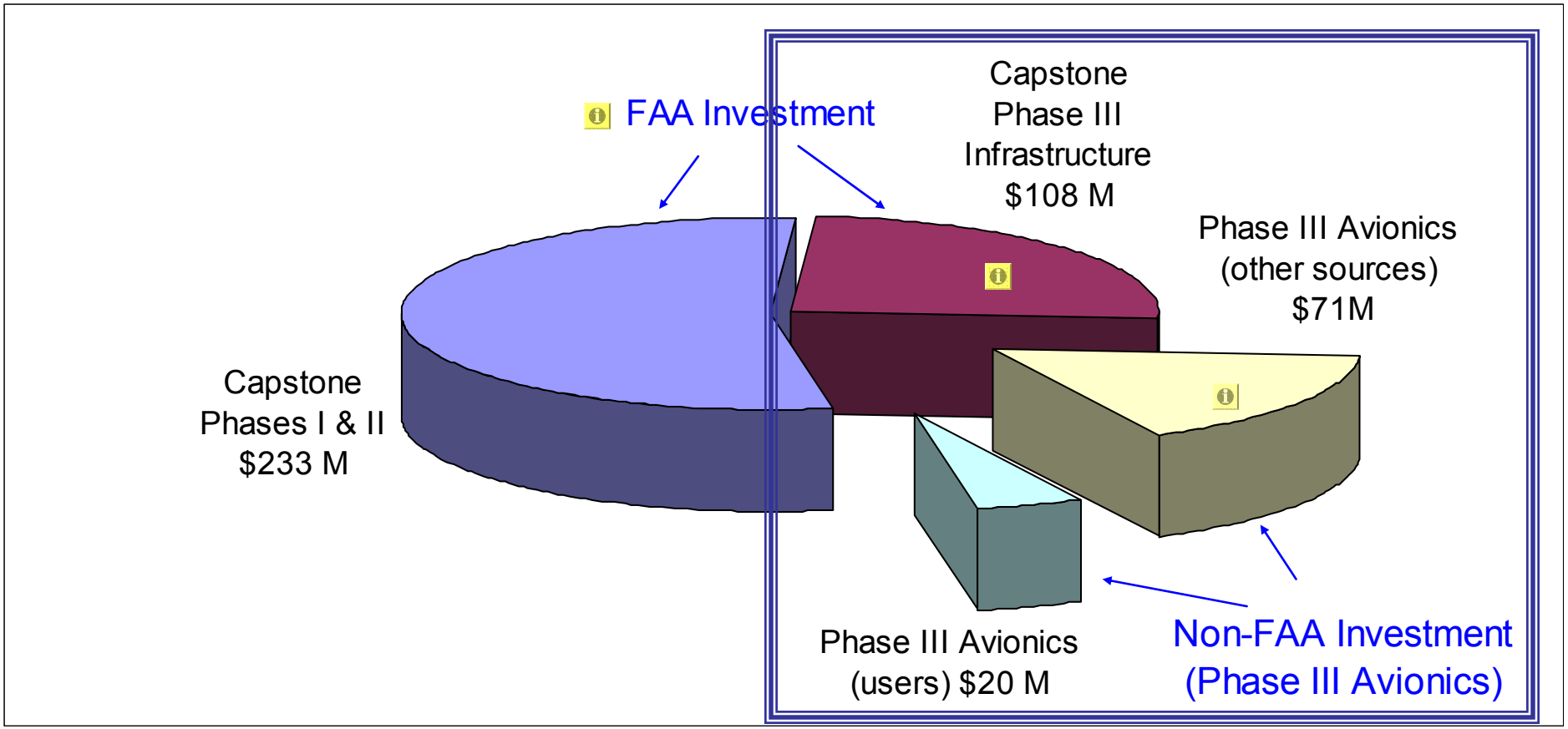
Why Should the Alaskan Aviation Community Invest in Capstone Avionics?

- Alaska has a high dependency on aviation for transportation for both residents and visitors
  - Seventy percent of Alaska's cities, towns, and villages cannot be reached on a road system
  - The number of licensed pilots in Alaska is seven times the national average
  - Where people in the lower 48 use cars and buses, Alaskans use private planes and air taxis
  - Alaska per resident flight hours are 20X the national average

- Alaska has a historically high aviation accident rate relative to the lower 48
  - The accident rate in Alaska is four times that in the rest of the U.S.
  - Alaska has 20X the number of fatalities per resident as the lower 48
  - A high percentage of Part 135 Operations into Alaskan airports have no published instrument approaches today

- Without meeting this investment challenge, the FAA may choose not to invest in the Capstone infrastructure

FAA and non-FAA Investment in Capstone

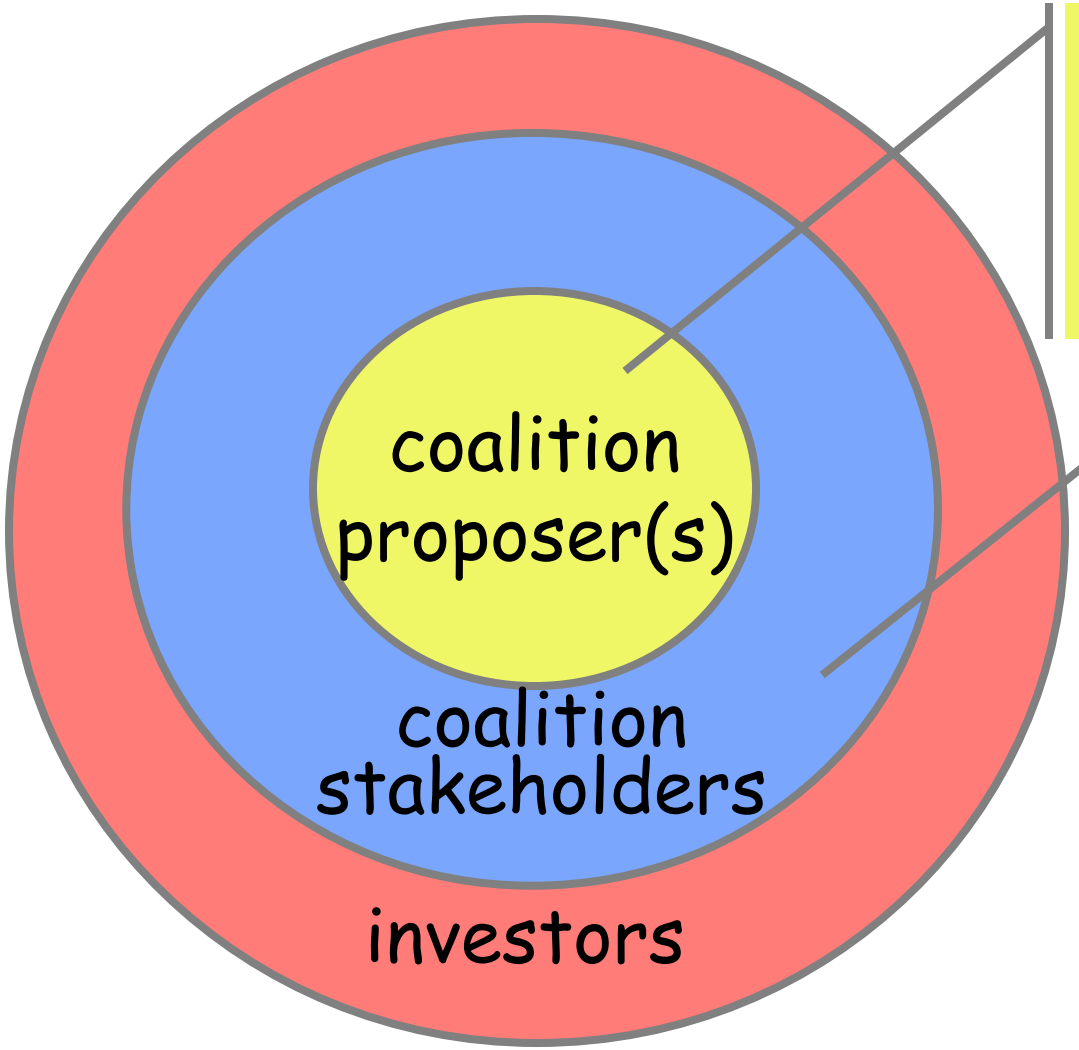


TWEB

Proposed Capstone Avionics Equipage Coalition Concept

- Assist the community in forming a coalition to invest in Capstone avionics so that Alaska realizes the potential safety, access and utility benefits
- Work in partnership with FAA to secure benefits statewide
- Evolve community support

Proposed Capstone Coalition Concept



Potential Roles

- Officially propose formation of coalition
- Invite other organizations to become coalition members

Potential Roles

- Expand the coalition to include the public beneficiaries of increased safety and access
- Determine the avionics assistance goals, eligibility criteria, and assistance amount formula
- Solicit and secure investments from Alaskan government and non-government organizations
- Advocate Capstone to the Alaska traveling public and to FAA management

Potential Coalition Stakeholders

Candidate Aviation Groups

- Alaska Air Carriers Association
- Alaska Airlines
- Alaska Airmen's Association
- Alaska Aviation Coordination Council
- Alaskan Aviation Safety Foundation
- Aircraft Owners & Pilots Association
- Experimental Aircraft Association
- Governors Aviation Advisory Board
- Institute of the North
- Medallion Foundation
- National Transportation Safety Board
- Seaplane Pilots Association

Candidate Public Benefit Groups

- Civil Air Patrol
- Coast Guard
- Commonwealth North
- Denali Commission
- Department of Defense
- DOT & PF
- Fish and Wildlife
- Native Corporations
- National Institute of Occupational Safety and Health
- State Hospital Association
- State School Board Association
- State Troopers
- University of Alaska Anchorage

Candidate Private Sector Organizations

- ATT/Alascom
- Conoco Phillips
- GCI
- Exxon Mobil
- Tesoro

What We Would Like…

- Your support for FAA statewide deployment of the Capstone infrastructure
- Your support for the Alaskan aviation community investing in the Capstone avionics
- Your support for the formation of a stakeholder coalition
- Your participation in a coalition

Current Members: Capstone Coalition 3/8/06

- Alaska Airmen's Association (AAA)
- Alaska Air Carrier's Association (AACA)
- Alaska Aviation Safety Foundation (AASF)
- Alaska Department of Transportation (DOT)
- Alaska Governor's Aviation Advisory Board (GAAB)
- Alaska Aircraft Owner's & Pilots Association (AOPA)
- FAA Alaska Region and Capstone Program (FAA)
- Institute of the North (ION)
- Medallion Foundation (MF)

Capstone Coalition: Purpose

"The purpose of the Capstone Coalition is to identify effective and feasible methods to maximize the equipage of Alaska-based commercial and general aviation operators with Capstone III avionics at the earliest possible date."

Capstone Coalition: Organizing Principles

- Volunteer coalition of independent organizations

- Co-chairs
  - Industry: TBD
  - FAA: Sue Gardner

- Coalition Working Group
  - Consist of Capstone Coalition members
  - Elected to be on Working Group
  - Prepare proposals for the Coalition to debate and vote on

Capstone Coalition: Proposed Work Plan Process

- Capstone Coalition sets date for work item(s)* completion
- Capstone Working Group gathers information and assembles proposal for debate
- Capstone Coalition meets one week later to consider its recommendation

* See proposed coalition work plan

Schedule of Next Steps

1. FAA provides Capstone details to a coalition: February
2. Coalition meets potential investors and users: March
3. Investors make tentative commitments (contingent on FAA approval of Capstone III plan): April
4. Capstone Office submits Capstone III plan with ground infrastructure proposal to FAA management: May
5. FAA Decision on plan and funding of Capstone ground infrastructure: July/August
6. Begin Capstone avionics installations: October ‘06

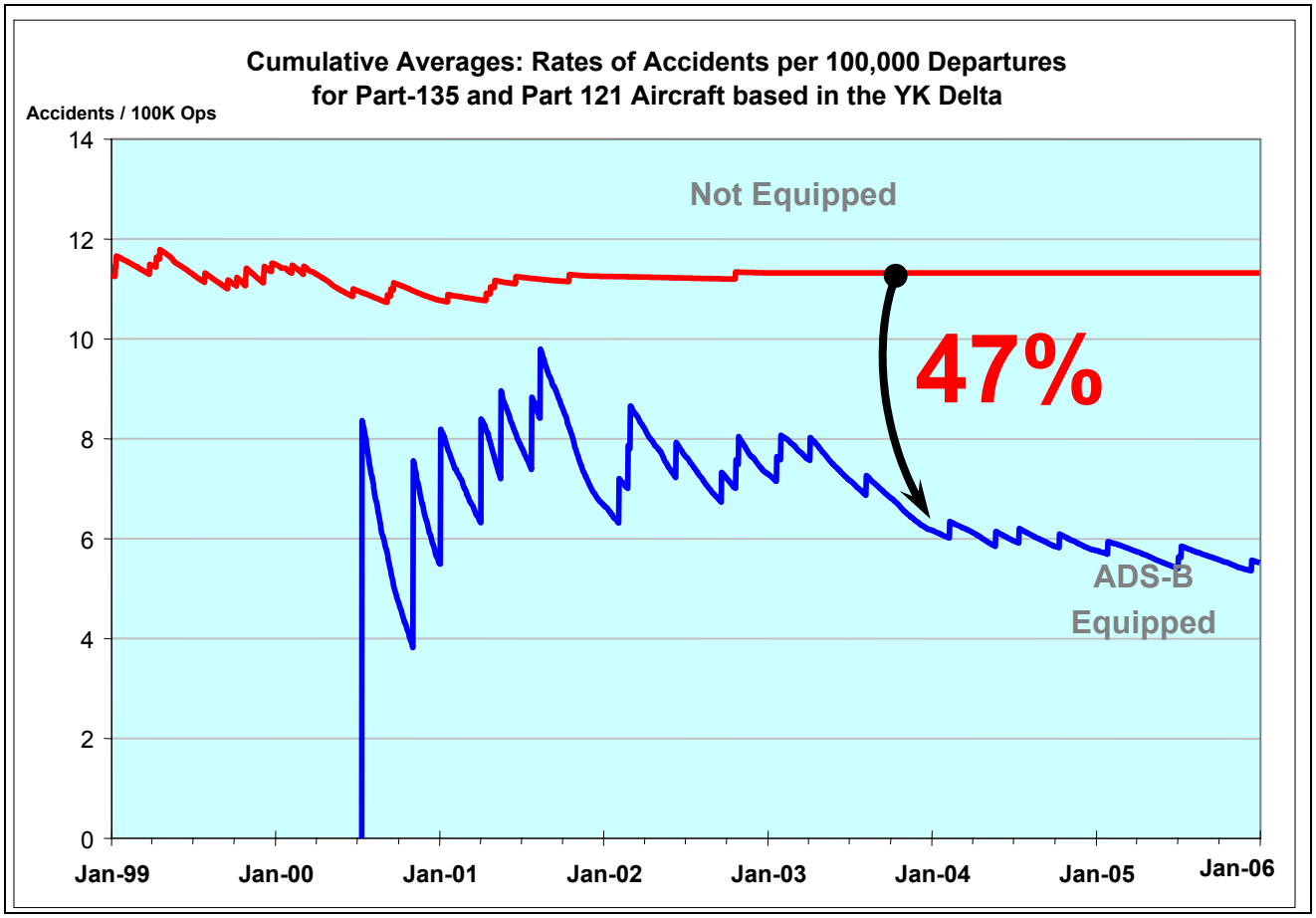
Slide Show Charts

Capstone Phases I and II

- Initially proof-of-concept and operational evaluations
- Ultimately, operational systems, services, and avionics
- Commercial operator participants
- FAA-owned avionics, FAA-paid installations

➢ *Capstone - technology focused safety program in Alaska that seeks near term safety and efficiency gains in aviation by accelerating implementation and use of modern technology*

Capstone Phase I Safety Benefits: 47% Accident Reduction



"Capstone now to us is a proven safety tool"
Sen. Ted Stevens (AK)

AVS Preliminary Phase III Safety Analysis Conclusions

- Capstone should avoid 6 fatal accidents (about 33 percent)
- Capstone should reduce the number of fatal accidents with from 10 to 2 serious injuries per year.
  - In total, Capstone should avoid about 14 accidents per year, reducing the overall number of accidents by about 10 percent.

Capstone Aircraft Based Services: GPS Moving Map

Shows pilot position

Relative to airports, rivers, lakes, roads, terrain features and obstacles

View of a river out the window

View of the river on Capstone avionics

Capstone Aircraft Based Services: Terrain & Obstacles

Partially obscured Windy Pass.

Shows pilot aircraft position relative to terrain and obstacles, *with color-coded relative terrain* altitude to aircraft.

Capstone Aircraft Based Services: Traffic (from ADS-B and TIS-B)

Shows pilot the position of nearby traffic, both Capstone-Equipped ADS-B, and transponder equipped by TIS-B

Legend

ADS-B air-to-air traffic

TIS-B traffic (from radar)

Capstone Aircraft Based Services: Flight Information Service (FIS-B)

FIS-B display of NEXRAD **shows pilots the position of rain, thunderstorms, and snow** on the moving map display.

JRC Decision: Exit Criteria For FAA Capstone Investment

- Refine the business case for final investment decision
  - Team to develop a plan and associated detailed schedule to determine any future JRC date
- Investigate all options for avionics incentivization with key stakeholder such as State of Alaska
- Complete all required plans for equipage, NAVAIDs divestment and rulemaking
- Consolidation of ADS-B work with the National ADS-B office

Capstone JRC Phase I & II Recommendations

1. Approve FY06 $9.2M Spend Plan ($14.5M Total)
   - Note: JRC approved FY06 $5.3M for Phase I&II activities –June 30 2005

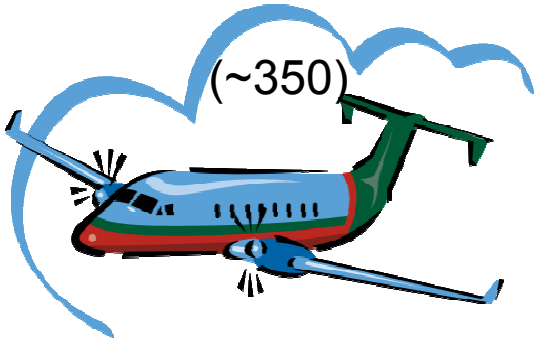
2. Secure Current FY07 CIP at $16.8M
   - Phase I & II ($1.8M)
   - Phase III ($9.0M)
   - Test and Demonstration ($6.0M)

3. Approve Results of “Initial Investment Analysis” - Phase III
   - Phase III ($M)
     - GBT/AWSS/Routes/Planning (($42.6M)
     - Avionics Equipage ($107.2M)
     - Navaid Divestment Costs ($6.4M)

Equipment Scenarios – Statewide*

- Approximately 5550 aircraft
- ** Costs vary according to extent of suite installed, installation complexity, etc.

(~350)



- Commercial Aviation IFR
  - Dual IFR WAAS GPS
  - Multi-function Display
  - ADS-B Data Link
- $14k to $44k ** installed package

($12M Total)

(~2200)

- Commercial Aviation VFR & GA IFR
  - IFR WAAS GPS
  - Multi-function Display
  - ADS-B Data Link
- $12k to $24k ** installed package

($40M Total)

(~3000)

- General Aviation VFR & Rotorcraft
  - Moving Map, Terrain, Traffic, Weather, Handheld Display
  - ADS-B Data Link
- $5k to $10k ** installed package

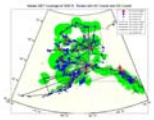
($22M Total)

Capstone Phase III Infrastructure

- Ground Infrastructure

- Ground based services

- GBT Service Volume



- IFR Infrastructure Enhancements

- NavAid Divestment

Capstone Ground-Based Services Ground Infrastructure

Ground Based Transceiver (GBT)

GBT / Communication Site

Other Capstone Ground Infrastructure

AWSS and Weather Camera Sites

(Often co-located with GBT Sites)

Capstone Ground-Based Services: Air Traffic Control

Anchorage Air Route Traffic Control Center

- ADS-B from aircraft displayed to controllers
  - VFR Flight Following by Air Traffic Controllers
  - IFR Surveillance with Radar Separation Standards

Capstone Ground-Based Services: Commercial Operator Flight Following

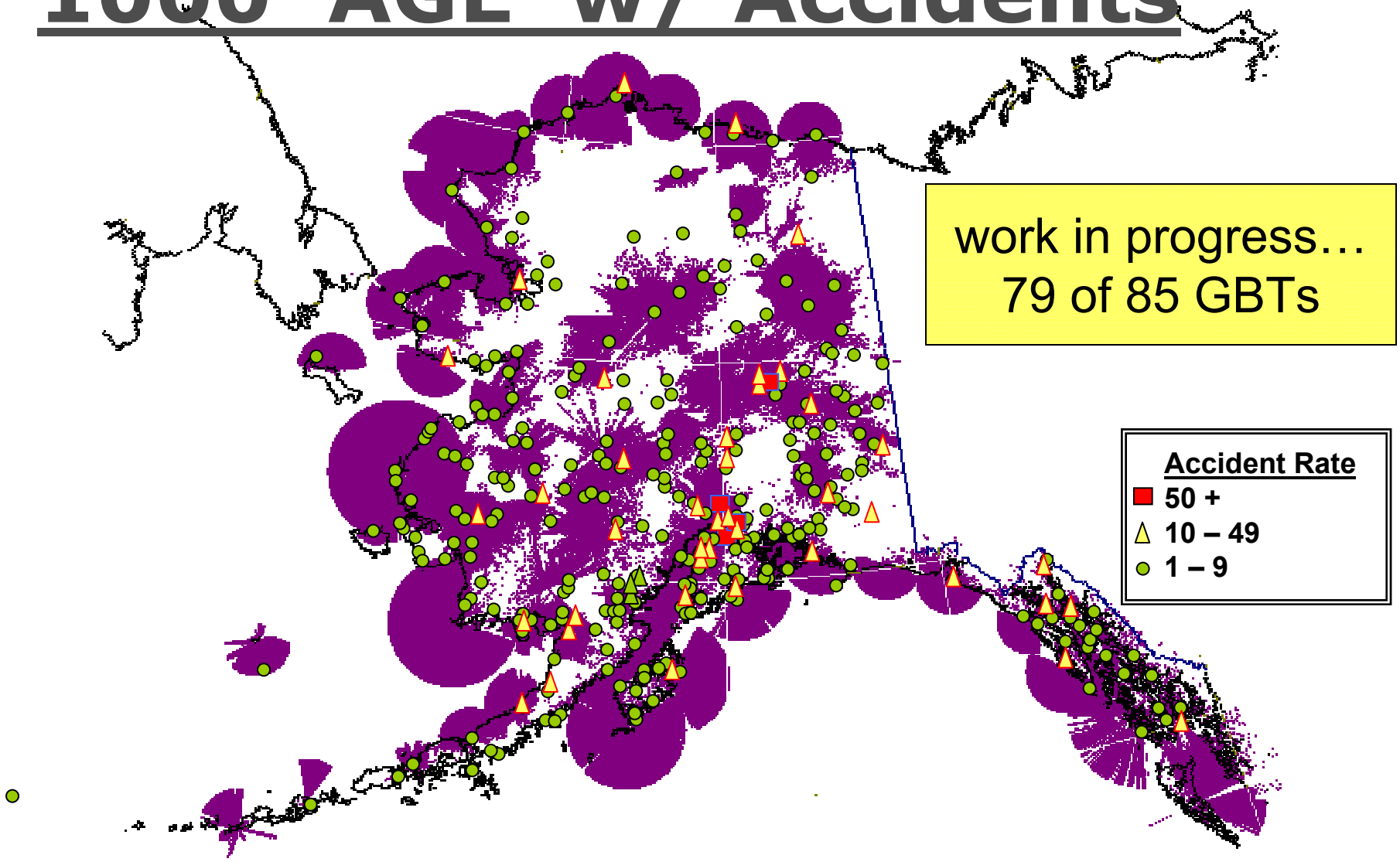
- ADS-B from aircraft to:
  - Track Aircraft Positions
  - Initiate Search and Rescue Efforts

Computer on Internet

GBT Placement Criteria and Service Volumes

- Ground Based Transceiver (GBT) placement under revision to meet industry objectives to cover:
  - High accident areas
  - High percentage commercial operations
  - Overland IFR airway routes
  - High traffic density VFR routes

1000’ AGL w/ Accidents



IFR Infrastructure Enhancements

- Objective
  - Improve safe navigation and access for Alaska communities

- Solutions
  1. Convert VFR-only airports to IFR-capable airports
  2. Improve existing IFR airports by coordinating the implementation of new, safer LPV/GPS approaches
  3. Lower MEAs to connect to community airport approaches and to allow aircraft to avoid icing conditions
  4. Create a route structure based upon space-based navigation to enable flexibility for more direct routing

Airport Selection: Identify Candidate Airports

- The Industry Council Transition Working Group identified objective criteria for airport selection in a written letter to the FAA
  - VFR airports only
  - Runway length > 2000’
  - Runway width > 35’
  - Public use only
  - No water airports included

- Objective method used to prioritize airports
  - Based on the ***estimated monetary losses*** to a community caused by VFR-only capable airports

Alaska Airports with Plans for Upgrade or Replacement

Airports being Upgraded

ARCTIC VILLAGE	'ARC	RNAV app scheduled
VENETIE	'VEE	RNAV app scheduled
TOKSOOK BAY	'OOK	RNAV app scheduled
EEK	'EEK	RNAV app scheduled
NIKOLAI	'FSP	RNAV app scheduled
NONDALTON	'5NN	RNAV app scheduled
KOKHANOK	'9K2	RNAV app scheduled
AKIACHAK		New airport 2011
ALAKANUK		New airport 2006
CHEFORNAK		New airport 2008
CHIGNIK LAKE		New airport 2010
EKWOK		New airport 2006
MANLEY HOT SPRINGS		New airport 2008
MINTO		New airport 2007
NIGHTMUTE		New airport 2010
OUZINKIE		New airport 2009
STONY RIVER		New airport 2008
TULUKSAK		New airport 2009
TUNTULIAK		New airport 2007

New Airports being Built

Candidate airports for upgrade from VFR-only to IFR-capable (55 airports)

Airport Selection Process:
From 700+ to 53 Candidate Airports

- 1st pass (97 airports)
  - 97 eligible airports from 700+ Alaska airports contained within NFDC data based upon TWG criteria

- 2nd pass (55 airports)
  - TWG review in January resulted in reduction from 97 to 55 airports
    - Reasoning for removal from list
      - Airports serving a population of zero (32)
      - Another airport min away(3)
      - Village relocation(1)
      - Terrain(3)
      - Already scheduled for upgrade(2)
      - USAF(1)
  - Sorted in priority order using objective method
    - TWG deviations to objective method
      - Birchwood- Population adjusted to account for proximity to Eagle River
      - Perishable cargo added to S. Nacknek and Ugashik
      - Umiat- State of AK priority despite 0 population
      - Goose Bay retained on list; placed at the bottom of list for future growth and training

- 3rd pass (53 airports)
  - Bradley Sky-Ranch deleted due to ownership issues
  - Karluk deleted due to community decline

Candidate Airports for Conversion from VFR to IFR Ca

Name	WG ranking	Current Lighting	Wx?	RCO	Notes: TWG, State & FAA
TUNUNAK	1	**MIRL + BCN**	none	no	AIP project (FY08)
GRAYLING	2	MIRL + BCN	none	no	AIP project (FY08)
KOBUK	3	MIRL + BCN	none	no	
QUINHAGAK	4	MIRL + BCN	AWOS	RCO	
PILOT STATION	5	**MIRL + BCN**	none	no	AIP project (FY08)
ELIM	6	**MIRL + BCN**	none	no	
BREVIG MISSION	7	**MIRL + BCN**	none	no	
SHAGELUK	8	**MIRL, REIL, PAPI, BCN**	none	no	
HUGHES	9	**MIRL + BCN**	none	no	
SHAKTOOLIK	10	**MIRL, REIL, PAPI, BCN**	none	no	
SLEETMUTE	11	**MIRL + BCN**	AWOS	no	
WHITE MOUNTAIN	12	**MIRL + BCN**	none	no	
KOYUKUK	13	**MIRL + BCN**	none	no	
CHUATHBALUK	14	REIL, MIRL, PAPI, BCN	none	no	
SHELDON POINT	15	**MIRL + BCN**	none	no	AIP project (FY08)
KASIGLUK	16	**MIRL + BCN**	none	no	
EAGLE	17	**MIRL, BCN, VASI**	none	RCO	
UMIAT	18	MIRL + BCN	none	no	State does not support upgrade
NUNAPITCHUK	19	**none**	none	no	AIP project (FY06)
BIRCH CREEK	20	**MIRL**	none	no	
LARSEN BAY	21	**MIRL + BCN**	none	no	
KWETHLUK	22	NIRL, PAPI, REIL BCN	none	no	
CIRCLE CITY /NEW/	23	**MIRL + BCN**	none	no	
CENTRAL	24	MIRL + BCN	none	no	
HEALY RIVER	25	**MIRL + BCN**	none	RCO	
BIRCHWOOD	26	MIRL + BCN	**AWOS**	no	

Candidate Airports for Conversion from VFR to IFR Capable (first half)

Name	WG ranking	Current Lighting	Wx?	RCO	Notes: TWG, State & FAA
TWIN HILLS	27	none	none	no	
ROBERT/BOB/CURTI	28	**MIRL, PAPI, BCN**	none	no	
LEVELOCK	29	**MIRL + BCN**	none	no	
SOUTH NAKNEK NR	30	**HIRL, VASI, BCN**	none	no	
NAPAKIAK	31	**MIRL + BCN**	none	no	
PORT LIONS	32	**MIRL + BCN**	none	no	
TATITLEK	33	MIRL + BCN	none	no	
PEDRO BAY	34	**MIRL + BCN**	none	no	
MC CARTHY	35	**none**	none	no	
DELTA JUNCTION	36	**none**	none	no	
SKWENTNA	37	**MIRL + BCN**	none	no	
NINILCHIK	38	none	none	no	State- road system airport, no $ to make IFR
UGASHIK/NEW	39	none	none	no	ANC FPO does not support- no pop, no maint
CLARKS POINT	40	none	none	no	
CHENEGA BAY	41	none	none	no	
CIRCLE HOT SPRING	42	**MIRL + BCN**	none	no	
KASILOF	43	none	none	no	State- road system airport no $ to make IFR
CHITINA	44	none	none	no	
TETLIN	45	**MIRL + BCN**	none	no	
COPPER CENTER 2	46	none	none	no	
MC KINLEY NATIONA	47	none	AWOS	RCO	
SUMMIT	48	none	TWEB	RCO	w/I 8 mi or Cantwell
CANTWELL	49	none	none	no	w/I 8 mi of Summit
TANACROSS	50	**none**	none	no	
PAXSON	51	**none**	none	no	
GOOSEBAY	52	none	none	no	State does not support upgrade
FALSE PASS	53	**none**	none	no	

Airport Conversion: Next Steps

- Develop airport infrastructure requirements listing for cost accounting and airport upgrade
  - Weather requirements
  - Communications requirements
  - Lighting requirements
- Develop benefits assessment resulting from upgrade based upon projected access improvements
  - Models used to approximate approach minima
  - Weather models used to approximate increased access
  - Access gained to be used in benefit calculation (like airport prioritization)
  - Results feed into JRC presentation
- Commence surveys of VFR airports for IFR conversion

Airport Instrument Approach Upgrades

- Goal is to provide GPS or LPV approaches at existing IFR airports to obtain lower non-precision minima than otherwise available

- Potential minima
  - 3200' and greater runway: As low as 250 and ¾
  - Non-precision: As low as 300 above obstruction and ½
  - Circling: As low as 300 above obstruction and 1 ½

Note: Not all airports will achieve these minima -- airport survey dependent!

LPV / GPS Approaches in Work

- Dillingham Rwy 01
- Emmonak Rwy 16, 34
- Homer Rwy 03, 21
- Hooper Bay Rwy 13
- St Michael Rwy 02, 20
- Atqasuk Rwy 06, 24
- Nuiqsut Rwy 04, 22
- Selawik Rwy 03, 21
- Wainwright Rwy 05, 23
- Alpine Airstrip Rwy 03, 21
- Barter Island Rwy 06, 24
- Bethel Rwy 18, 36
- Badami Airstrip Rwy 03, 21
- Deadhorse Rwy 04, 22
- Kuparuk Rwy 05, 23

All Scheduled for the 2006-2007 Timeframe

Airport Instrument Approach Upgrades: Next Steps

- Identify IFR airports that could support LPV approaches
  - WAAS Program Office planning tool
  - Alaska Flight Procedures Office databases
  - Other requirements

- Develop benefits assessment resulting from upgrade based upon projected access improvements
  - Models used to approximate approach minima
  - Weather models used to approximate increased access
  - Access gained to be used in benefit calculation (like airport prioritization)
  - Results feed into JRC presentation

MEA Reduction: Lower Altitude Routes to Connect Airport Approaches and Avoid Icing Conditions

- The Industry Council Transition Working Group will work with FAA (Air Traffic) to identify lower routes
- FAA Air Traffic will evaluate workability, airspace considerations, infrastructure requirements and necessary training to achieve implementation
- FAA will conduct cost-benefit analysis to determine feasibility
- FAA will make an implementation decision and publish reduced MEA routes, as applicable, according to the normal FAA charting cycle

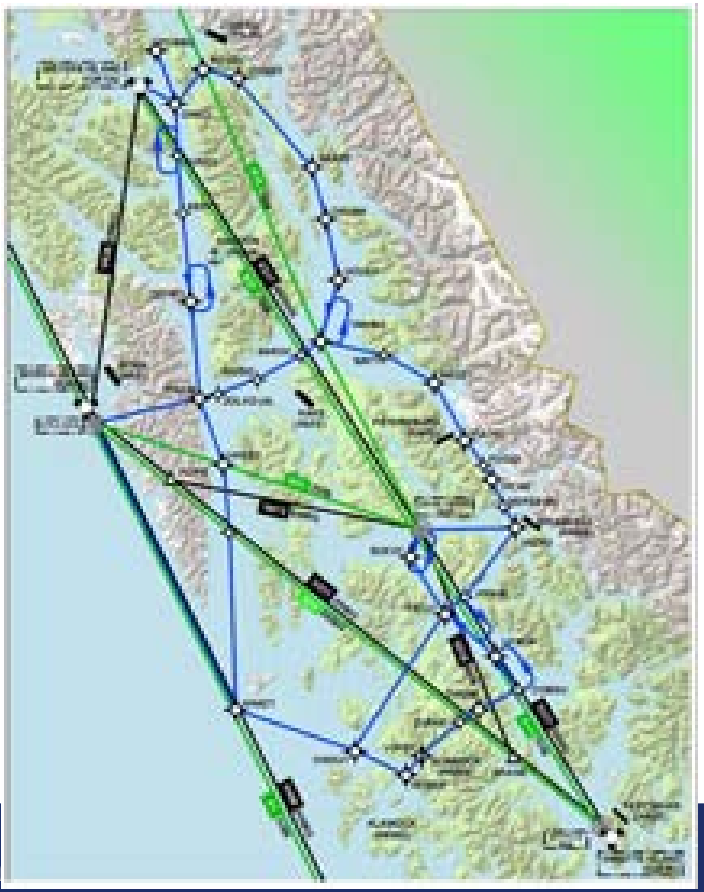
GPS Based Route Development:

- The Industry Council Transition Working Group will work with FAA Air Traffic to identify routes to be developed
- FAA Air Traffic will evaluate workability, airspace considerations, infrastructure requirements and necessary training to achieve implementation
- FAA will conduct cost-benefit analysis of the new routes to determine feasibility. This will potentially replace some NAVAID based routes with space based (GPS) routes
- FAA will make an implementation decision and publish space based routes as applicable, according to the normal FAA charting

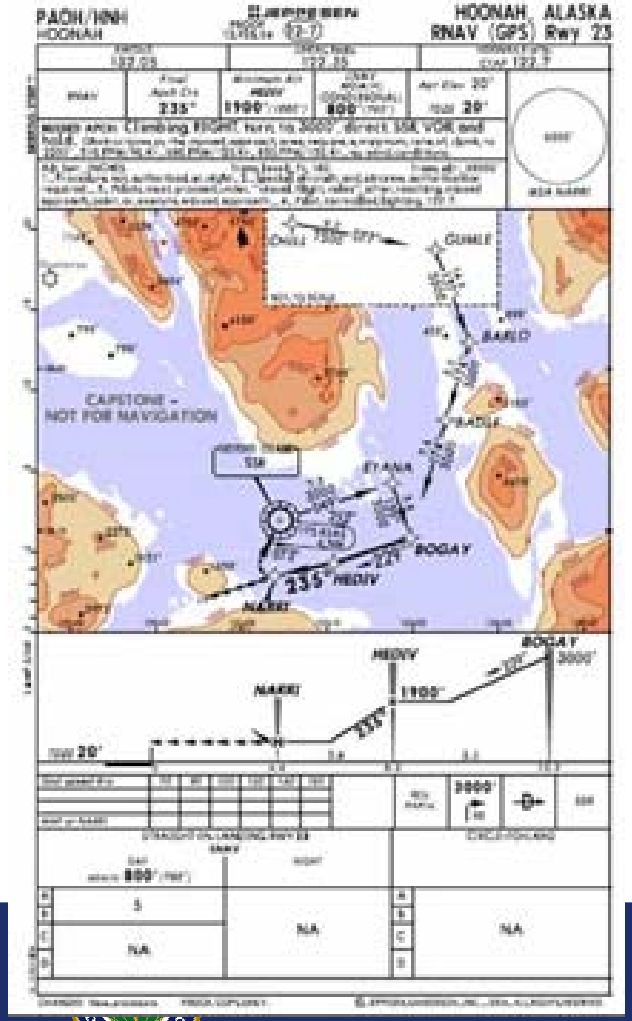
Additional IFR Capability - GPS/WAAS Enabled
SE Alaska Commercial Operator Special Procedures

Lower MEA Airways

- Capstone Special RNP-1: 3-4,000 vs.
- Capstone Public RNP-2: 6-8,000 vs.
- Prior Public VOR 8-10,000 Ft.



Lower Minima and New IFR Approaches



NAVAID Divestment

- Objectives
  - Reduce the FAA O&M cost of maintaining unnecessary ground based NAVAIDS
    - Where a space-based approach is available
    - Without reducing access or safety within Alaska
  - Retain the existing legacy infrastructure where needed for international air carrier operations
- Objective criteria was developed to support divestment while preserving access and safety
  - Accounting for international users
  - Providing access to hospitals and hub airports
  - Ensuring one layer of routes for legacy transition
- A total of 80 NDBs and 15 VORs identified

Potential Issue: Divestment and TWEB

- NAVAID divestment has the potential to impact TWEB coverage in Alaska
- The Capstone Program Office is researching alternatives to TWEB
- The FAA will not divest TWEB assets without replacing services with a viable alternative source

TWEB Evolution Alternatives

Current TWEB Architecture

Some NDBs

Analog Voice Broadcasts

Some VORs

Near term alternatives (case-by-case):

- Direct telephone access to FSS
- Cellphone access to FSS
- AM radio broadcasts
- Retain some or all current TWEB outlets

Mid-Far Term

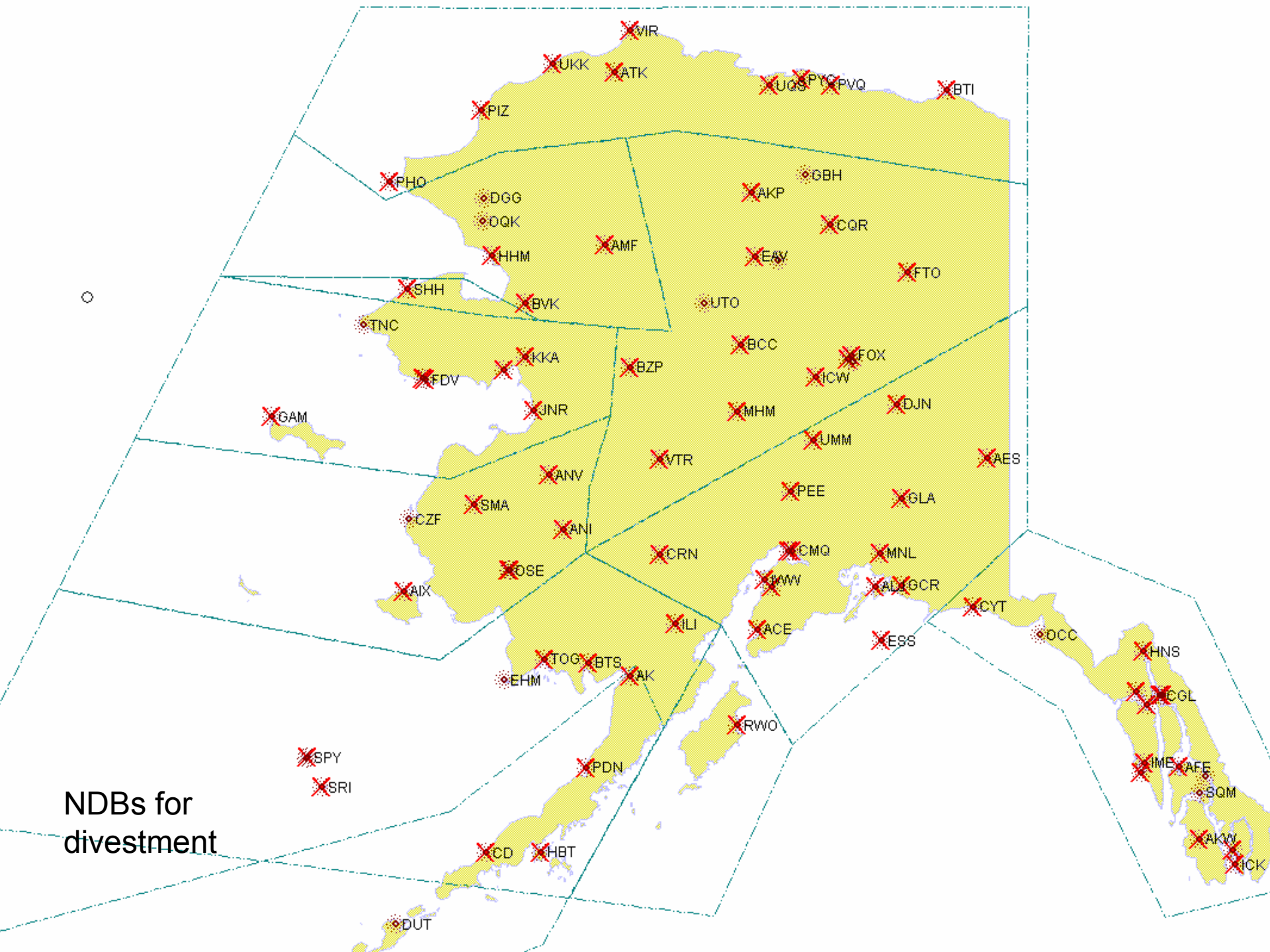
GBTs

Candidate List for NDB Divestment (First 40)

NAME	ID	ARPT_ICA	Airport Approaches	Hospital	TWEB	ASA?	Dupe NDB?	Dupe VOR?	Route attached?	
AMBLER	AMF	PAFM	GPS, NDB		YES	N	DME	none	V477, V401	
ANAKTUVUK PASS	AKP	PAKP	GPS, NDB		N	N	N	N	A4	
ANIAK	ANI	PANI	ILS, LOC, GPS,NDB		YES	N	N	N	B3, G6, R39, V508	
ANVIK	ANV	PANV	GPS, NDB		N	N	N	N	B3, G15, R50	
ATQASUK	ATK	PATQ	GPS, NDB		N	N	N	N	PATQ missed app., G17, G18	
BARTER ISLAND LRRS	BTI	PABA	GPS, NDB		YES	N	N	N	B26, G16	
BEAR CREEK	BCC	PATA	GPS, VOR		N	N	N	TAL	R50	
BETHEL	ET	PABE	ILS/DME, LOC/DME, GPS A	Bethel	N	N	OSE	BET	N	
BISHOP	BZP	PAGA	ILS, VOR, TACAN, NDB		N	N	N	GAL	B4, B12, G7, R50	
BORLAND	HBT	PASD	GPS, NDB		N	N	N	N	G2, G12	RCO?
BROWERVILLE	VIR	PABR	ILS, LOC, GPS 6/24, VOR, D	Barrow	N	N	VIR, IEY	BRW	G16	
BRUCK	BOB	PANC	ILS, LOC, GPS 7/14, VOR	Anchorage	N	N	N	ANC	N	
BUCKLAND	BVK	PABL	GPS, NDB		N	N	N	N	N	RCO?
CAIRN MOUNTAIN	CRN	PASV	GPS, NDB		N	N	N	N	N	
CAMPBELL LAKE	CMQ	PANC	ILS, LOC, GPS 7/14, VOR	Anchorage	Y	N	BOB	ANC	A1, A7, G8	
CHANDALAR LAKE	CQR	PALR	none		N	N	N	N	A15, V436, V447,	
CHENA	CUN	PAFB	ILS, GPS, VOR, TACAN	Fairbanks	N	YES	N		A2, A15, B26, G7, R50	
CLAM COVE	CMJ	PAKT	ILS/DME, GPS, NDB	Ketchikan	N	N	N	N	none	
COGHLAN ISLAND	CGL	PAJN	LDA, GPS, NDB	Juneau	N	N	N	N	A15	
DELTA JUNCTION	DJN	PABI	GPS, TACAN, VOR, NDB		YES	N	N	BIG	A2-15, B25	
DUTCH HARBOR	DUT	PADU	GPS, NDB		N	YES	N	N	G8, R99	
ELEPHANT	EEF	PAJN	LDA, GPS, NDB	Juneau	N	N	N	SSR	PAJN missed app, A15, B37, B38	
ELFEE	CD	PACD	ILS, GPS, LOC, VOR, TACAN		N	N	N	CDB	LOM	
EVANSVILLE	EAV	PABT	LOC, VOR, GPS		YES	N	N	BTT	A2, A3, A4, B4	
FORT DAVIS	FDV	PAOM	ILS, LOC, GPS, VOR, NDB	Nome	YES	N	OYN	OME	A1, B2, B27, GG7, G212, R35	
FOX	FOX	PAFA	ILS, GPS, VOR, TACAN	Fairbanks	N	N	N	N	N	
FREDERICKS POINT	FPN	PAPG, PA	LDA, GPS || LDA, GPS,	Petersburg,	N	YES	N (LOC @ F	N	PAPG missed approach	
GAMBELL	GAM	PAGM	GPS, NDB		YES	N	N	N	B96, G7	RCO
GLACIER RIVER	GCR	PACV	ILS/LOC, GPS, NDB	Cordova	N	N	N	n	n	
GLENNALLEN	GLA	PAGK	GPS, VOR		YES	N	N	GKN	B25, G8	RCO
GOLD	OYN	PAOM	ILS, LOC, GPS, VOR, NDB	Nome	N	N	FDV	OME	none	
GUSTAVUS	GAV	PAGS	GPS, VOR, NDB	Juneau	N	N	N	N	N	
HAINES	HNS	PAHN	none		YES	N	N	N	A15, B38, B40	RCO
HOTHAM	HHM	PAOT	ILS, LOC, GPS, VOR,	Kotzebue	YES	N	N	OTZ	B2, B3, B12, B27, G18,	
ICE POOL	ICW	PANN	GPS, NDB	Fairbanks	N	N	N	ENN	R39	
ILIAMNA	ILI	PAIL	GPS, NDB		YES	N	N	N	G4, R99	RCO
KACHEMAK	ACE	PAHO	LOC, GPS, NDB	Homer	YES	N	N	HOM	G8, R99	
KAKE	AFE	PAFE	GPS, NDB		N	N	N	N	none	
KLAWOCK	AKW	PAKW	GPS, NDB		N	N	N	N	none	

Candidate List for NDB Divestment (Remaining 40)

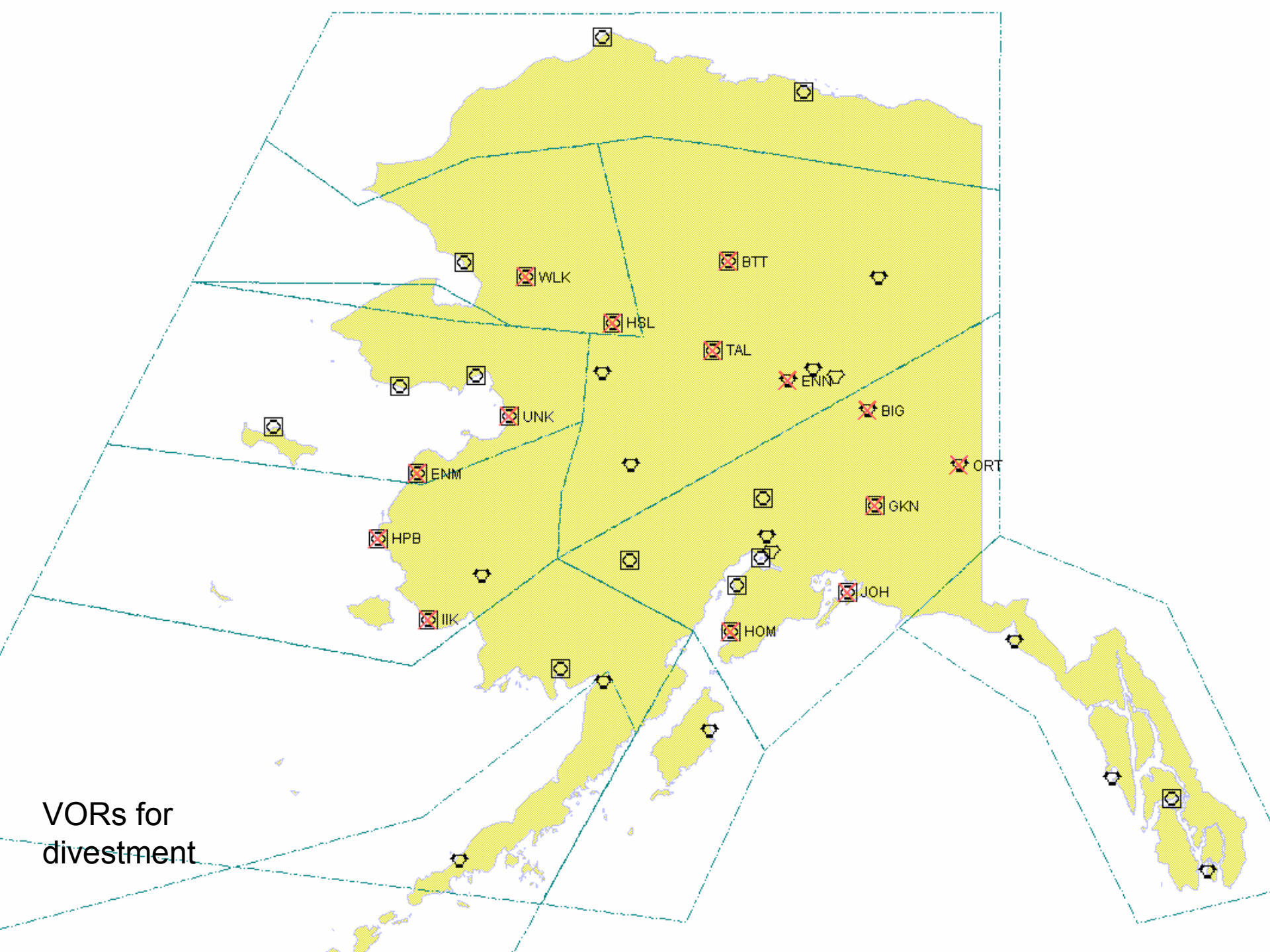
NAME	ID	ARPT_ICA	Airport Approaches	Hospital	TWEB	ASA?	Dupe NDB?	Dupe VOR?	Route attached?	
KOYUK	KKA	PAKK	GPS, NDB		N	N	N	N	none	
MENDENHALL	MND	PAJN	none		YES	N	N	CGL	none	
MINCHUMINA	MHM	PAMH	GPS, NDB		N	N	N	N	R39	
MINERAL CREEK	MNL	PAVD	none		N	N	N	N	A7, B25	
MOUNT EDGECUMBE	IME	PASI	LDA, GPS, VOR, NDB	Sitka	N	N	LOC	N	none	
MOUNT MOFFETT	ADK	PADK	GPS, NDB		N	YES	N	NUD	G1, G8, V480	
NABESNA	AES	PAOR	GPS, VOR, NDB		N	N	N	ORT	A2-15, G8	
NANWAK	AIX	PAMY	GPS, NDB,		YES	N	N	N	R50, V319	
NICHOLS	ICK	PANT	none			N	N	ANN	A10, A15, B28, B79	
NORTH RIVER	JNR	PAUN	LOC, VOR, GPS		N	N	N	UNK	A1, B3	
NORTON BAY	OAY	MOS	none		N	N	N	MOS	B3, G7	
NUIQSUT VILLAGE	UQS	PAQT	GPS		N	N	N	N	G16	
OCEAN CAPE	OCC	PAYA	ILS, LOC GPS, VOR		YES	YES	N	YAK	A1	
ORCA BAY	ALJ	PACV	none		N	N	N	JOH	A1, B25	
OSCARVILLE	OSE	PABE	ILS/DME, LOC/DME, GPS A	Bethel	Y	N	ET	BET	B27, G9, R39, R50	
PETERS CREEK	PEE	PATK	GPS, VOR, NDB		YES	N	N	TKA	none	
PITSAND	PYC	PAKU	ILS (no published app.)		N	N	N	N	none	
POINT HOPE	PHO	PAPO	GPS, NDB		N	N	N	N	B5, V531	
POINT LAY	PIZ	PPIZ	GPS, NDB		YES	N	N	N	B2, G16, G18	
PORT HEIDEN	PDN	PAPH	GPS, NDB		N	N	N	N	G10, G12, R2	
PRIBILOF	SRI	PAPB	ILS, LOC, GPS,		N	N	N	N	none	RCO
PUT RIVER	PVQ	PASC	ILS, LOC, GPS, VOR, TACAN		N	N	N	SCC	A3, A15, G16	
REEVE	SNP	PASN	ILS, LOC, GPS, NDB		N	N	SPY	N	none	
SAINT MARYS	SMA	PASM	LOC, GPS, NDB		YES	N	N	N	B27, G6, G15	
SAINT PAUL ISLAND	SPY	PASN	GPS, ILS, LOC,NDB		N	N	SNP	N	G10, R1, R99, V480	
SALDO	AK	PAKN	ILS, LOC, GPS, VOR, TACAN		YES	N	N	AKN	LOM, B27, G8, G12, R1, R99	
SHISHMAREF	SHH	PASH	GPS, NDB		YES	N	N	N	B8	
SITKA	SIT	PASI	LDA, GPS, VOR, NDB	Sitka	YES	N	N	BKA	A1, B28, R51	
SOLDOTNA	OLT	PASX	GPS, VOR, NDB		N	N	N	ENA	none	
SUMMIT	UMM	PAST	none		YES	N	N	N	none	
SUMNER STRAIT	SQM	PAWG	LDA, GPS	Wrangell	YES	YES*	N	LVD	PAWG missed approach*	
TAKOTNA RIVER	VTR	PAMC	LOC, VOR, GPS		N	N	N	MCG	A1, B12, G15, R39	
TOGIAK	TOG	PATG	GPS, NDB		N	N	N	N	V350	
WAINWRIGHT VILLAGE	UKK	PAWT	none		N	N	N	N	G16, G17	
WEARR	FA	PAFA	ILS, GPS, VOR, TACAN	Fairbanks	N	N	CUN, FOX, I	FAI	LOM to FAI	
WESSELS	ESS	PAMD	GPS, VOR, NDB		YES	N	N	MDO	none	
WILDWOOD	IWW	PAEN	ILS, GPS, VOR		YES	N	N	ENA	none	
WOOD RIVER	BTS	PADL	LOC, GPS 1/19, VOR, NDB	Dillingham	N	N	N	DLG	G4	
WOODY ISLAND	RWO	PADQ	ILS, GPS, VOR, TACAN, ND	Kodiak	YES	N	N	ODK	B27, G2, G10	
YAKATAGA	CYT	PACY	none		YES	N	N	N	none	
YUKON RIVER	FTO	PFYU	GPS, VOR, TACAN,		YES	N	N	FYU	B4, B26	



NDBs for divestment

Candidate List for VOR Divestment

NAME	ID	ARPT_ICAO	Airport Approaches	Hospital	TWEB	ASA?	Dupe NDB?	Dupe VOR?	Route attached?	Notes
Hooper Bay	HPB	PAHP	GPS / VOR	n	Yes		n	n	V319, V333, V385, V488, V496,	
Emmonak	ENM	PAEM	GPS / VOR	n	Yes		n	n	J179, J510, V350, V385, V459, V510,	AWOS at PAEM
Unalakleet	UNK	PAUN	GPS / LOC / VOR	n	No		JNR	n	J111, J135, J510, V385, V440, V453, V488	AWOS at PAUN
Huslia	HSL	PAHL	GPS	n	No		n	n	V477, V531	Voice FAI FSS
Selawik	WLK	PASK	GPS / VOR	n	No		n	n	V477, V531	Voice OTZ radio, AWOS at PASK
Bettles	BTT	PABT	GPS /LOC /VOR	n	No		EAV	n	J139, J515, V444, V445, V504	Voice FAI FSS, ASOS at PABT
Tanana	TAL	PATA	GPS / VOR	n	Yes		BCC	n	V488, V489, V531	RCO to FAI FSS, ASOS at PATA
Nenana	ENN	PANN	GPS / NDB	n	Yes		ICW	n	V488, V489, V531	ASOS at PANN
Big Delta	BIG	PABI	GPS / VOR / TACAN / NDB	n	Yes		DJN	n	V444, V481, V515	ASOS at PABI
Northway	ORT	PAOR	GPS / VOR / NDB	n	No		AES	n	J124, J502, J507, J515, V444, V456	ASOS at PAOR, Wx obsr
Gulkana	GKN	PAGK	GPS / VOR	n	Yes		GLA	n	J124, J167, J511, V456, V481, V482, V515	ASOS at PAGK
Johnstone Point	JOH	PAJO	none	n	Yes	n	ALJ	n	J133, J167, J501, J617, V319, V320, V481, V482, V617	
Middleton Island	MDO	PAMD	GPS / VOR	n	Yes		ESS	n	J179, J605, J804R, V440, V441, V508	AWOS at PAMD
Homer	HOM	PAHO	LOC / GPS / NDB	yes	Yes		ACE	n	J617, V321, V322, V357, V435, V438, V439, V617	ASOS at PAHO
Kipnuk	IIK	PAKI	GPS	n	Yes		n	n	V319, V328, V333, V480	ASOS at PAKI



VORs for divestment

NAVAID Divestment: Next Steps

- Capstone to coordinate with stakeholders on specific NAVAID divestment planning and implementation
  - ATO-W: Ownership and divestment procedures
  - ATO-E: Impact on enroute IFR and VFR infrastructure
  - Department of Defense: Impact upon DoD users

- Capstone to develop cost savings figures as inputs to the JRC presentation